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MEDICAL AND SANITARY

INSPECTION OF SCHOOLS

FOR THE HEALTH OFFICER, THE PHYSICIAN THE NURSE AND THE TEACHER

BY

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ILLUSTRATED WITH 71 ENGRAVINGS AND 14 FULL-PAGE PLATES

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DEDICATED

TO

MY SONS, ALAN AND RICHARD

AND

THE OTHER SCHOOL CHILDREN OF AMERICA

PREFACE.

We realize that the progress of our civilization, the welfare of the individual, and the general good of society are contingent upon the efficiency of the education imparted to the children in the public schools. To take advantage of such opportunities, children must be physically and mentally equipped.

This volume represents an effort to prepare for physicians, nurses, and teachers a guide to the physical examination of school children. The aim is not only to outline plans of what and how such work can be best performed, but also to develop a deeper appreciation of the relations of physical and mental development. Medical inspection of schools has more than justified its existence; it has come to stay, and have an ever-increasing power of service.

In these pages the endeavor is to give definite, rationalized plans to prevent epidemics of contagion in the schools, and to recognize and correct physical defects of school children. Chapters on the sanitation of school buildings have received special consideration. Plans of work have been formulated to meet all requirements for efficiency, time, labor, and money-saving. The author's excuse of ability to write this book is twelve years' experience in the work of medical inspection of school children and three years in charge of the Division of Child Hygiene.

In the race, to run over the wrong route is worse than not to run; so the proper thing is to study the course before you start. If these writings prove a trustworthy map to those who undertake the work of medical inspection of school children I shall feel that my labor is fully repaid.

The text is profusely illustrated, with the hope that this feature will add to the value of the book as a guide to those interested in medical and sanitary inspections of schools.

For the loan of valuable illustrations the author is indebted to the Board of Education, Philadelphia; *The Teacher;* Dr. L. C. Wessels; Springfield Drinking Fountain Company; Arlington Chemical Company, Yonkers; Dr. E. R. Johnstone, Vineland Training School; P. B. McCullough, D.D.S., Dr. James Warren Sever, Boston; Board of Education, Toledo, Ohio.

S. W. N.

PHILADELPHIA, 1913.

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MEDICAL INSPECTION OF SCHOOLS.

INTRODUCTION.

Public education is a question which vitally concerns the national government, as well as every State, city and district, and includes within its scope all classes and races. In its general management the problem is identical for every State, city, and town, but the details, depending as they do on surrounding conditions, are chiefly local matters coming under the supervision of the local authorities without outside interference. In the United States, twenty millions of children, or one-fifth of the entire population, are enrolled in the public schools.

The salaries paid to teachers each year amount to more than two hundred million dollars, and the total expenditures on public schools exceeds four hundred million dollars. Besides this enormous annual expenditure there is a permanent investment in public school buildings amounting to over nine hundred million dollars. This requires the levying of a heavy taxation on the people. There is a "general" tax which is levied on the citizens of the State as a whole and a "local" or self-imposed tax levied by each city or town. Four-fifths of the school taxes are of this kind. That this additional burden is cheerfully borne is ample evidence that the people realize the importance of the proper education of children. Not only do the people give willingly of their income, but many of the best and

most influential citizens give their services freely in acting as directors for the management of these institutions. To make this great expenditure for education effective, there must be good teaching, and children physically adapted to take advantage of the education offered.

The progress in medical science, due largely to laboratory research and sociological investigation, has brought to light the causative factors of disease and demonstrated that many are preventable; thus making possible the great advances in preventive medicine, sanitation, and hygiene. Diseases formerly looked upon as visitations of Providence are now known to be almost entirely preventable, and the preservation of health and life by preventive measures has become the watchword of the medical profession. The relation of the schools to these achievements of medical science is of great importance. These endeavors on the part of the medical profession have brought the physician in contact with the school, and have claimed his interest in educational affairs. The physician soon noted the close association between the mental and physical condition of the child. Simultaneously, the teacher outgrew the early educational methods of teaching *en masse,* and advanced to the modern methods in pedagogy of teaching the individual child. Both teacher and physician noted the marked variations in the mental capacities of different pupils, and recognized the importance of a combined study of the causative factors. To them, therefore, medical inspection of schools owes its existence.

Eighteen years of school medical inspection in America and almost forty years abroad have carried us beyond the question of why such work is needed, and have placed the best and most efficient methods and systems within our reach. There are still a few doubters and disbelievers, but

such dissenting voices will always be heard for the same reasons that there are people who are opposed to vaccination and antitoxins, or progress along any line. The value of medical inspection of schools needs no greater endorsement than the fact that many of the State legislatures have passed laws authorizing the establishing of a system of inspection, and in three States medical inspections are mandatory.

The history of medical inspection of schools includes the history of both the school doctor and the school nurse. England was one of the first countries to look after the physical needs of the school child. There nurses were appointed before physicians; in America the process was reversed.

School nursing may be considered as a development of visiting nursing. The latter originated in England about 1860 and reached America in 1877, when a New York City Mission sent the first trained nurse into the homes of the poor. Before 1905 the work was sporadic, but since then it has gained considerable headway.

The school nurse, representing a new idea in visiting nursing, began work in Liverpool in 1887, when nurses paid daily visits to a few schools for the purpose of attending to minor injuries and complaints. They also called at the homes of children who had more serious ailments and urged the parents to obtain the services of a physician. The early school nurses were volunteers, and it was not until 1901 that the London School Board appointed salaried municipal school nurses, with definite duties assigned. They examined the children for contagious skin diseases and excluded all cases found. The nurses did not treat the cases, and consulted only occasionally with the school medical officer. Later the nurse tested the vision and hearing, and kept a record of the physical examinations of the pupils.

In 1907 a superintendent, and, recently, assistant superintendents were appointed.

The first school medical officer was appointed in London in 1891. His duties were to examine absentees from school who failed to furnish a doctor's certificate. The following year, Dr. Francis Warner published a full report of the examination of fifty thousand school children.

In America, Boston is credited with having established the first system of school inspection, in 1894. New York had a medical inspector, Dr. Moreau Morse, in 1892, but did not establish a system of inspection until 1897. One hundred and fifty physicians were appointed that year by the Department of Health to inspect the school children. These physicians received a salary of thirty dollars a month, and their duties consisted in visiting the schools each morning, to examine all children sent them by the teachers as suspicious cases of contagious disease. This system was in effect until 1902, when the inspectors were required to give more time to the work, and the salary was increased to one hundred dollars per month. The system was then elaborated to include a routine inspection of all children in the classrooms for the purpose of detecting cases of contagious eye and skin diseases. Home visits were made to absentees to detect unreported cases of contagious disease.

The routine inspection of children in the class-rooms resulted in the exclusion from school of large numbers with cases of minor contagious diseases. It was evident that such exclusions had a limited value, and in many instances had a harmful effect, as the cases were not considered by the parents of sufficient importance to warrant medical treatment. This procedure caused enforced absence from school, and not only interfered with the education of the children, but often made them habitual truants.

At this time experiments were made with a trained nurse, Miss Lina L. Rogers, who volunteered to do the work. The result showed not only marked improvement in school attendance, but demonstrated that all danger of infection could be controlled, and that the children could remain at school without danger to themselves or their classmates.

As a result of this experiment the first staff of municipal nurses to be employed in the Unites States was established in November, 1902, by the Department of Health of the city of New York. In December, 1902, a hospital and dispensary for the treatment of contagious eye diseases was established by the same department, and in 1905 the medical inspectors began complete physical examinations of all school children.

Notwithstanding these many changes, the results hoped for did not materialize. The physicians and nurses succeeded in obtaining for treatment only 6 per cent. of the physically defective children. The records soon amounted to little more than a mere compilation of statistical data, and very little to show for the work. This resulted in the organization of the Division of Child Hygiene, and a largely increased staff of trained nurses.

Experiments showed the economy and efficiency of placing the control of contagious diseases in schools in the hands of the school nurse, leaving the medical inspector free to devote his entire time to making physical examinations of the children. In January, 1912, this system of medical inspection was inaugurated, utilizing the services of seventy-four medical inspectors and one hundred and seventy-nine nurses, under the supervision of a staff of supervising inspectors and supervising nurses.

In 1901, the author started a daily class-room inspection of the school children in Philadelphia, and in 1903 inaugurated a system of inspection, utilizing the services of a trained

nurse. The success of this work resulted the following year, in the organization of a corps of fifty medical inspectors to perform the work in the schools and control contagious diseases.

By 1905, fifty-five cities had adopted some form of inspection, and at present there are over five hundred cities and towns in the United States, with medical inspection of schools. The objects of the work include:

1. The detection of contagious diseases, thereby protecting the child and the community.

2. The detection of physical defects which prevent the child from acquiring a full education with the least sacrifice to his physical welfare.

3. To find the capacity of the individual pupil to acquire knowledge in accordance with his mental and physical status.

4. To insure the best possible hygienic surroundings for the child while he is in school.

5. To bring a closer relationship between the school and the home so as to carry out more successfully the other aims of medical inspection and insure treatment for discovered defects.

6. To teach the practice of hygiene and healthful living both in school and at home.

PART I.

ADMINISTRATION.

GENERAL CONSIDERATIONS.

INVESTIGATION of the work performed in five hundred cities of the United States shows variations from completely organized, efficient systems, to unorganized and partial inspections of the school children. The inspections are made by physicians, nurses, and teachers, independently or in any combination, and in some instances by physical instructors.

While medical inspection of schools is not necessarily most effective when the work is performed by physicians, their services are required when a thorough physical examination is desired. Nurses, teachers, and other laymen may perform a number of the duties, but diagnosis and medical judgment can be obtained only from physicians, who may be part of the staff or volunteer consultants. Volunteer work has rarely proved successful. When something is required for nothing, one cannot command, and services are rendered at the will and desires of the giver. A volunteer often looks for a subsequent reward and if it is not forthcoming he stops work. Small cities or towns which believe they cannot afford the usual compensation for medical services should at least provide a small fee and avoid the uncertain services obtained from volunteer work.

A careful comparison of results obtained by the various methods of conducting examinations shows that the greatest benefits are obtained when a preliminary examination is made by the teacher or a nurse, all defective or suspicious cases are then reëxamined by trained physicians, who can devote sufficient time to the work without interruptions of private practice during school hours. Stated hours must be given for complete physical examinations of the children. Nurses are needed for the "follow-up" work to urge the treatment of defects.

Supervision.—Neighboring towns with a few schools and a small number of pupils may have the same inspector, and arrange the work so he shall devote one or two days each week to examine the children in a district. This physician should be under the supervision of the board of health of the county.

In cities where a staff of physicians and nurses are employed the administrative responsibility is vested either in the board of health or the board of education. In the early years of medical inspection, the boards of health had the supervision in most of the cities, but at present about three-fourths of the cities vest such power in the board of education. As to which is the more desirable is a much mooted question. To the author it seems that there is little difference provided both of these departments work in harmony. The department least dependent upon political activity and most successful in obtaining appropriations is the one which will achieve the most desirable results.

Cost of Maintenance.—The cost of maintenance varies with the school population, the amount and character of work required, and the efficiency of the examiners. The greatest expense is in the salaries for the inspectors; printing, supplies, and minor expenditures are a relatively small item

even in large cities. The annual salaries of school doctors and school nurses as tabulated by the Department of Child Hygiene of the Russell Sage Foundation are as follows:

	No. of cities where doctors receive salary indicated.	No. of cities where nurses receive salary indicated.
No salary	75	21
$1 00– 100 00	47	0
$101 00– 200 00	50	0
$201 00– 300 00	44	2
$301 00– 400 00	25	0
$401 00– 500 00	24	1
$501 00– 600 00	18	21
$601 00– 700 00	2	17
$701 00– 800 00	12	24
$801 00– 900 00	6	15
$901 00–1000 00	13	2
$1001 00–1500 00	18	2
$1501 00–2500 00	7	0
$2501 00–4000 00	3	0
Fees according to service	19	1

According to this table the majority of school physicians are paid under six hundred dollars per year. The character and amount of services rendered are in proportion to the salaries paid. A city that pays a small salary and requires more than three hours' work each day is apt to have the work either slighted or performed by disinterested men unskilled in the best professional knowledge. It is more advantageous to have a small corps of a high standard of efficiency and well paid, than a large one with less efficiency and small salaries. It is a mistake to require physicians to devote their entire time to the work. Half a day or the morning session is sufficient for school inspection, and the remainder of the day should be allowed for private or hospital practice. Such an arrangement assures more ambitious and better trained men.

Laws on the Medical Inspection of Schools.—The movement providing for medical inspection of schools has re-

ceived considerable recognition from the legislatures of some States; and at the present time the United States Government, through its newly created "Children's Bureau," is about to make an exhaustive investigation of the subject.

Three States, Massachusetts, New Jersey, and Colorado, have statutes making medical inspections mandatory throughout their jurisdiction. In New Jersey the law states, "Every Board of Education shall employ a competent physician . . . every Board of Education shall adopt rules for the government of the medical inspectors."

Four States have laws making inspection compulsory in certain cities or districts. Of this group, Pennsylvania, through its "School Code," enforces compulsory inspection in Philadelphia and Pittsburgh. In Indiana there is a most stringent statute, which compels physical examinations in Indianapolis. This law applies to all public, private, and parochial schools, and specifies the tax rate for this purpose. In Ohio the cities must and the rural districts may perform the work. In New York, the children in most of the large cities are examined.

Many States, such as Georgia, Kentucky, Louisiana, Maryland, Mississippi, Rhode Island, South Carolina, and Virginia have no legislation on medical inspection, but there are efficient systems of inspection in many of the cities in the territory. For example, there are four cities in Virginia, five in Georgia, and eight in Rhode Island that have efficient systems of school inspection without any legislative power for so doing.

Finally, there is a group taking in California, Connecticut, Minnesota, Washington, and the District of Columbia that has by legislation permissible examinations.

The foregoing shows the absolute lack of any concerted action on the part of the States in regard to the medical inspection of schools. In one case the law may be so complete as to specify how frequently examinations shall be made; and again, the physical examinations may consist of nothing more than the testing of hearing and vision by teachers. Nevertheless, what legislation exists at the present time represents progress, and although it is not absolutely necessary to the adoption of medical inspection in schools, it is of great assistance to the work, defines the powers and duties of those in charge, and gives official recognition which aids in obtaining results.

The "School Code" of Pennsylvania contains the following provisions for medical inspection of schools:

12. School Medical Inspectors.

a. Medical and Sanitary Inspection.

SECTION 546. 1, Such medical inspection (annually of all the pupils of the public schools) shall be made in the presence of the parent or guardian of the pupil, when so requested by parent or guardian.—18 May, 1911, art. 15, §1501, P. L. 391.

SECTION 547. 2, The medical inspectors shall, at least once each year, inspect and carefully test and examine all pupils in the public schools of their districts, giving special attention to defective sight, hearing, or other disabilities and defects specified by the (State) commissioner of health in his directions for the medical examinations of schools. Each medical inspector shall make to the teacher, or, if the board of school directors so directs, to the principal or district superintendent of schools, a written report concerning all pupils found to need medical or surgical attention, and giving careful directions concerning the care of each pupil who needs special care while in school. The

teacher, or the principal, or district superintendent shall keep such report until the end of the school year, shall carry out as carefully as possible said directions concerning the special care of pupils while in school, and shall promptly send a copy of the medical inspector's report upon each child to the parents or guardian thereof.—18 May, 1911, art. 15, §1505, P. L. 392.

SECTION 548. 3, The medical inspector shall, at least once each year, and as early in the school term as possible, make a careful examination of all privies, water closets, urinals, cellars, the water-supply, and drinking vessels and utensils, and shall make such additional examinations of the sanitary conditions of the school buildings and grounds as he deems necessary, or as the regulations of the State department of health, or the rules of the board of school directors or of the local board of health require. He shall see that the laws of the commonwealth relating to the health and sanitation of the public schools and the requirements of the local board of health are complied with.—18 May, 1911, art. 15, §1506, P. L. 392.

SECTION 549. 4, (The medical inspector) shall promptly make such reports to the (State) commissioner of health as are required by him or by the regulations of his department, and such reports to the local boards of school directors as he deems necessary, or as are required by the (State) commissioner of health or by the board of school directors. He shall perform such other duties as may be required by the health and sanitation laws of this commonwealth or by the board of school directors.—18 May, 1911, art. 15, §1507, P. L. 393.

SECTION 550. 5, No person having tuberculosis of the lungs shall be a pupil, teacher, janitor, or other employee in any public school, unless it be a special school carried

on under the regulations made for such schools by the (State) commissioner of health.—18 May, 1911, art. 15, §1509, P. L. 393.

Legislation pertaining to the physical examination of school children should provide for the inspection of all pupils whether in private, parochial, or public schools. The examinations should be compulsory and not at the option of the school authorities. Likewise teachers and janitors should be subjected to physical examinations.

To avoid friction between the educational and health authorities, the statute should specify which department is to assume responsibility for both maintenance and administration. For the guidance of the administrative officers the duties of the inspectors should be clearly set forth and provision made for the enforcement of certain recommendations of the examiners. To cover cases where it is impossible to persuade parents to obtain treatment for physical defects which hinder the education of the child, some penal provision should be made to insure the proper execution of any law imposing a duty upon the people.

If there are no public health laws which authorize the exclusion from school for the failure to receive a vaccination against smallpox, or where a communicable disease exists, such provisions should be made in legislation on school inspections.

THE MEDICAL INSPECTOR.

Systems of medical inspection which have for their object not only the detection of cases of contagious diseases but also the diagnosis of physical defects, require trained physicians as inspectors. Some cities and towns conduct the examinations of pupils without the immediate service

of a physician. In such cases the work is performed by teachers or nurses, but their diagnosis is, or should be, submitted to a physician for confirmation. These teachers or nurses should not be called medical inspectors. They are valuable accessories to medical inspection, and each have their place. They may perform equally as well such duties as testing of vision or hearing, but there are few other defects which they can diagnosticate with certainty and safety. School inspections frequently require medical services, and these cannot be rendered by a teacher or a nurse. They are not graduates of a reputable medical school and licensed by the State to practise medicine in all its branches, therefore they are not legally qualified to perform medical duties.

In towns where it is impossible to command the services of a physician, the teacher or a nurse may act in the capacity of examiner and refer suspicious cases to a physician who may volunteer his services.

Number of Inspectors Required.—One medical inspector to every five thousand pupils is a fair average in estimating the number of physicians required for the work in a city. This figure will vary with the amount of work to be done; depending on the number of pupils in a school, the distance between the buildings, the character of the population, the probable number of defects found, and the system of inspection employed. Where the schools are situated, in suburban or outlying sections, several miles apart, an inspector should take a smaller number of pupils, as much time is lost travelling between the schools. In a congested section of the city with schools close together, he can spend more time in actual work. Among the foreign population a greater number of defects exist, and more time is required to have recommendations carried out. On the

other hand, if the children are American born, parents generally attend to their physical needs promptly, requiring less effort on the part of the medical inspector. The school population that should be assigned to one inspector also varies with the number of duties and the system of inspection employed. A system overloaded with clerical work decreases the probable number of pupils that can be efficiently cared for.

Qualifications and Training of Inspectors.—Any competent, conscientious physician may be trained for the position of medical inspector. The great number of applicants for these positions makes it difficult at times to choose. The "merit system," or civil service examination, which eliminates favoritism and political interference, has solved the problem in those cities where such methods are adopted. Where practical questions pertaining to duties of the position have been asked, and due allowance made for previous training, the civil service method has been successful.

The appointment of physicians as school inspectors, where civil service examinations and rules are not observed, should require much thought by the appointing powers. The personality of the doctor, his previous training, his interest and enthusiasm in the work, are all worthy of consideration. It is desirable to have a physician who has had previous training in the diagnosis of contagious and skin diseases, and practical knowledge of some of the specialties, particularly the eye, ear, nose, and throat. Internes from hospitals for contagious diseases receive valuable training for this work. Previous experience in some social work, giving an idea of the relation of home conditions to physical defects, serves the inspector in a number of ways, and should be considered in making an appointment. The University of Pennsylvania offers a

special course to those desiring to apply for such positions. It is unfortunate that more of the medical colleges do not offer special courses to train physicians in this new post-graduate work. In the author's opinion, if the remuneration to medical inspectors was larger, more men would take special courses to better qualify for the positions. That there are methods of training a corps of physicians after appointment is true, but the time which can be spared for such instruction is limited. Such after-training may consist in personal instruction at the contagious disease hospital and lectures on skin diseases and the other specialties by experts. Instructions on the practical work in the schools may be given by supervisors or trained inspectors.

Duties of Inspectors.—The physician should visit daily all the schools assigned to him. He should examine the children sent by the teachers for suspicious signs of contagion. Accuracy in diagnosis is necessary to prevent epidemics. When a contagious disease exists in a school, every precaution must be taken to prevent the occurrence of other cases.

The medical examiner should not only diagnose physical defects which may handicap a child in its schooling, but also try every conceivable means to have such defects corrected. The glaring defects may be called to the physician's notice by a teacher, but the greater number must be found by a thorough systematic physical examination of each child.

The responsibility of the school physician for the healthful living of the children at school and at home is of importance. He should recognize unsanitary and unhealthful conditions at school, which may cause illness, and aid the teacher in her instructions on hygiene, thereby directing the children in proper living at home.

Investigations and reports from various cities often estimate the amount of work performed by medical inspectors by the number of pupils examined and number of hours spent in doing the work. These are poor criterions. Quantity is a minor consideration compared with quality, which is measured by results obtained, especially in the correction of defects found. The work performed naturally varies with the capabilities of the inspectors. Some are quick and accurate in diagnosis, interested and persistent, and at the same time tactful in recommendations to parents, thus achieving results. Others fail to recognize important physical defects and even contagion. Furthermore, they may be disinterested and fail to obtain results from recommendations. Due allowance must be made for the character of school population. Most of the foreign element take kindly to recommendations for treatment, provided the inspector aids them in obtaining the necessary medical assistance. Some parents, however, resent being told that their children have certain defects, and object strongly when urged to seek advice. Many of these cases are converted by tactful consultations between physician and parent.

Equipment of Medical Inspectors.—The equipment needed for the medical examiner depends on the duties he is to perform and whether they include the supervision of contagious diseases in the homes. If he enters infected houses he should carry a leather bag containing a gown of rubber or white duck, a cap, pair of rubbers, lysol or bichloride of mercury tablets for disinfection of hands, rubber gloves, syringe for administering antitoxin, placards and literature issued by the health department for instruction of families. The contents of the bag can be constantly disinfected by adding to the equipment a tin box with perforated lid containing gauze kept wet with formalin.

An ample supply of blanks and cards for recording the work performed should be carried or kept at the schools. Few cities allow the medical examiners to undress children for thorough physical examinations, and he must, therefore, depend more upon subjective signs and symptoms than upon the use of instruments of precision to diagnose defects. A stethoscope is occasionally required for examinations of the chest. Culture outfits for the laboratory diagnosis of diphtheria are frequently required.

Vaccine virus and diphtheria antitoxin should not be carried by the inspector unless for immediate use. Virus and antitoxin not kept on ice rapidly deteriorates and becomes inert.

In each school there should be a room set aside for the inspector and nurse in which examinations can be made. This room should be well lighted and if possible at least twenty feet long, to admit of examination of vision.

Several test cards should be placed on the wall in a good natural or artificial light. Running water at a sink or wash bowl is necessary. A small medicine closet should be equipped with such supplies as may be required for emergency—bandages, cotton, adhesive plaster, collodion, bichloride tablets, aromatic spirits of ammonia, alcohol, and a number of wooden tongue depressors. The latter are inexpensive, and can be thrown away after an examination, a distinct advantage over a metal depressor carried by the inspector. Toothpicks or wooden applicators are handy for many purposes. This same closet may contain the equipment necessary for the nurse, such as ointments and lotions. All poisons should be kept separate and in colored bottles plainly labeled "poison." This closet should always be kept locked, and when not in use the key kept in the office of the principal. A supply of record

blanks and literature for instruction should be in each school.

Additional Work during Summer.—Where medical inspectors are under the supervision of the health department, and paid for twelve months' work, they can be utilized during the summer months in campaigns to reduce the mortality among infants. They can supplement the inspectors engaged on contagious diseases, and if smallpox is prevalent, they can constitute a special vaccinating corps. Philadelphia uses their services to fill absences during summer vacations. Where the examiners are employed by the Board of Education, they should be subject to the same rules as teachers, and allowed the summer months free.

DIRECTOR AND SUPERVISORS.

Qualifications and Training.—In cities employing a large number of inspectors, it is necessary to have a director, or chief of the division, and, if numbers warrant, one or more assistants or supervisors. A supervisor can manage ten to fifteen medical inspectors. The director is responsible to the Superintendent of Schools or the head of the Health Department. His duties are to superintend the work of all the inspectors. If supervisors or assistants are employed, they are responsible to the chief or director for the work performed by the men under them. The success of the department is largely dependent upon the efficiency of the director. He must have executive ability combined with a thorough knowledge of the subject of medical inspection. He should know the sections of the city in relation to social conditions. A man of education and refinement, coupled

with a pleasing personality, is one much desired. Tact and diplomacy will serve him well on many occasions. Resourcefulness, friendliness, and firmness, coupled with gentleness, are traits of value. He should be a good teacher and disciplinarian, capable of directing wisely. His strength, energy, and judgment should not be dissipated on small details and minor duties, which can be cared for by others whose time is less valuable.

The only previous training which will prepare a physican for the position of director is former service as a medical inspector and experience in some executive position which entailed his managing others. The same qualifications are required for his supervisors or assistants.

Duties.—The director must outline a practical system of inspection suited for his city. The system must be simple and not burdened with unnecessary clerical work. He has under his care a number of men with varying ability and personalities, and it is his duty to organize his corps that there shall exist uniformity in the work. The physician who has formerly specialized on the eye, must be watched that he does not report only eye defects; the nose and throat specialist must be discouraged from devoting too much attention to these organs, and so on with all the specialists. However, it is well where another inspector is in doubt, to utilize the knowledge of those men in the department who are experts on the subject. The director does well to gain the admiration and respect of his men by kindness and thoughtfulness. When one man has failed to do a thing properly, the individual should receive censure rather than the department. Respect the opinions and welcome suggestions from the inspectors.

It is necessary for the chief to make occasional visits to the schools to watch the character of the work performed

and to lend encouragement. These visits do not always show the true quality of an inspector's work, for he may put forward an extra effort for the occasion. Questioning the principals of schools as to the quality of the work is also bad policy and avails nothing. Few inspectors fail to stand well with the principals, and such questioning only leads the school authorities to doubt the efficiency of their visiting physician. When necessary, tactful investigations can be made without the knowledge of principal or doctor. The requisities which are set down for the chief also apply to his assistants.

Executive Ability and Office Control.—The chief sources of information which the head of the department has at his command, as to the work performed by each one under him, are the reports of his supervisors and the daily reports of each inspector. This shows how necessary it is to have a system that is simple and practical and not overloaded with numerous forms. The daily reports should tell him almost at a glance where something is going wrong. It is impossible for a chief to inspect the work of each man each day. He must depend on those under him, and if he is fortunate enough to have confidence in the work of a subordinate, it is well to show this trust. Encouragement and interest in the work can be given to the medical inspectors by occasionally calling on them to perform some special work which they may be individually interested in, and from which the department can benefit. A custom of going elsewhere for advice and suggestions regarding work which can equally as well be obtained from the employees of the department is poor policy. It disheartens the members of a corps, and tends toward routine and monotonous work that is detrimental.

Many of the present systems of medical inspection have

a great variety of forms which add to the clerical work and detract from the practical results. These systems, with their large number of blank reports, are subject to frequent changes by revision and additions, which tend to make confusion in the department. A glance in the office closets and store-rooms for discarded forms and literature is an index of efficiency. While simplicity and practicability should be the essential features in designing recording blanks, allowance must be made for gathering statistics of value. Good statistics based on actual work are necessary for the adjustment of activities.

BUREAUS OF CHILD HYGIENE.

Five cities in the United States have a Bureau of Child Hygiene as a part of their health department, and in three of these cities medical inspection of schools is one of the functions of the bureau. The work includes everything which pertains to the child from birth, and even prenatal conditions, until the child reaches the working age. Factors for the reduction of infant mortality, including supervision over midwives, maternities, baby farms, day nurseries and foundling institutions, are important features of the work. Medical inspection of schools and the enforcement of laws relating to child labor, including the issuing of employment certificates, are performed by the same inspectors or a separate corps under the supervision of this bureau.

In Philadelphia the Division of Child Hygiene includes the care of the child to the time of entering school, and public school inspection is under the supervision of the Board of Education.

Philadelphia employs fifty medical inspectors, one chief

of school medical inspection, and five supervisors. Each supervisor has a district or part of the city arranged according to school population, and in charge of ten inspectors. The school population is about 200,000. These inspectors are under the Board of Education, and are employed only in the public schools.

FIG. 1

Filing records at the central office in the health department.

As the "School Code" failed to arrange for the inspection of the parochial schools, the Bureau of Health assigned these schools to the contagious disease inspectors in charge of the wards where such schools are located. This work is supervised by the assistant chief medical inspector.

Chicago has school inspection as a part of its Child

Hygiene Bureau, and for its 400,000 pupils in both public and parochial schools employs one hundred medical health officers or inspectors and forty-one nurses. For administration purposes, five of these medical health officers are selected to supervise the other ninety-five without extra pay. Two of the nurses supervise the other thirty-eight. The city is divided into ninety-five districts, to each of which is assigned a medical officer.

New York City has a Division of Child Hygiene under the supervision of a director, who is responsible to the sanitary superintendent. The staff of the division for school inspection includes seventy-four medical inspectors, one hundred and seventy-nine nurses, and seventeen clerks. The nursing staff is directed by a superintendent of nurses, who is responsible to the chief of the division. In each borough there are one or more supervising nurses to superintend the work of the nurses detailed to that borough.

The functions of the division are educational and administrative. Its educational functions consist in teaching parents, particularly mothers, in the care of infants and children, and in the need of timely prevention and treatment of physical defects.

Its administrative functions include:

1. The medical inspection of school children to detect the presence of contagious diseases, and the examination of the children to determine the presence of physical defects.

2. The enforcement of such laws of the State, such provisions of the "Sanitary Code," and such other regulations of the Board of Health as bear directly on the protection of the health of children of the community.

3. The supervision and regulation of the practice of midwives in the city of New York.

4. Through permits, the regulation of the conditions under which children are boarded out and the supervision of women engaged in the care of children.

5. The supervision of institutions harboring children and of day nurseries.

6. The issuance of employment certificates to children who have complied with the provisions of the child labor law, for the purpose of preventing the employment in factories or in mercantile establishments of children who are physically unfit to be so employed.

Organization.

The division forms a part of the sanitary bureau of the department. The budget appropriations for the work have been as follows:

1909	1910	1911	1912
$335,370	$348,190	$386,390	$554,095

The staff consists of:

152 medical inspectors (physicians).

263 trained nurses (who must have registered with the Board of Regents of the State of New York).

55 nurses' assistants.

23 cleaners.

31 clerks and typists.

All employees are included in the civil service classification.

In addition, the following temporary employees are assigned for the extra duties of the infants' milk stations from May 1 to October 1:

55 trained nurses.

55 nurses' assistants.

The organization proper consists of:

Central Organization.

Director of Child Hygiene.

(Who is the administrative officer of the division, in charge of the work throughout the entire city, and is directly responsible to the Sanitary Superintendent.)

Assistant Director.

Supervising Inspector of Infants' Milk Stations.

Superintendent of Nurses.

Clerks and Typists.

Borough Chief, in each borough.

(Directly responsible to the director, and in charge of the indicated borough.)

Supervising Inspectors.

(Each in charge of a squad of from ten to fifteen inspectors and under the direct supervision of the Borough Chief.)

Supervising Nurses.

(Each in charge of a squad of from fifteen to twenty nurses, and directly responsible to the Supervising Inspectors.)

Medical Inspectors.

Nurses.

Nurses' Assistants.

Cleaners.

Clerks and Typists.

SCHOOL NURSE.

In many cities where physicians were employed to perform the school inspections, innumerable defects were recorded, but only a small percentage received treatment.

This was due to indifference or ignorance on the part of parents, who did not realize the importance of the recommendations, and to the inability of the physician to spare the time to personally explain to them the dangers of certain diseases. It was evident that some connecting link was necessary between the doctor and the parents, the school, and the home. The school nurse has filled this gap in medical inspection.

In the early days of school inspection, the duty of the physician was to detect contagious diseases and exclude all such cases. No distinction was made between the major infections, such as scarlet fever and diphtheria, and the minor contagious skin diseases, impetigo and ringworm. Children afflicted with any disease known to the medical profession as contagious or communicable were excluded until cured, and often remained from school longer than the illness warranted, due to failure to obtain medical advice and treatment. Many pupils were thus deprived from schooling when a few treatments at school would have made it safe for them to remain in the class-room. The system not only deprived the child of valuable hours of teaching, but tended to make truants of those with a weakness in that direction.

With the progress of school inspection came the examination for physical defects which might interfere with the progress of the child. Many defects were found and many written recommendations were sent to parents, only to receive scant attention. Although records and reports were plentiful, results were not forthcoming.

Poverty, indifference, and ignorance were causes assigned for the failure to obtain treatment for the defects found by the school physicians. It was evident to those in authority that to obtain results some auxiliary to school

inspection was needed. The trained school nurse with her "follow-up" system was the solution of the problem. Her work has steadily grown, and become systematized, and today it is conceded that school nursing is one of the most important parts of the work of medical inspection. The thousands of cases in the care of nurses can be accurately determined, but there is no way to estimate the benefits to the school and the child, the suffering alleviated, the number of children brought to a condition in which they receive the full benefits of school instruction, or the number of lives saved

Number Required and Appointment.—Most school physicians are employed to perform a certain amount of work, and while in some cities a specified number of hours is assigned, rarely the entire working day is required. School nurses, on the other hand, must work the entire day and six days per week. The working day includes the five school hours, some of the noon recess, and also time after school. The greater amount of time allotted to her work permits a nurse to attend a greater number of pupils than the school doctor. Eight thousand pupils is a fair average to apportion to one nurse. This number of pupils will require her entire time, and will not permit any outside or additional work, such as teaching mothers the care of infants or supervising milk depots. In cities where nurses must perform other duties, it is advisable to assign a nurse to each inspector or one to a district.

The appointment of nurses depends upon which municipal department has control of school inspection. If a city employs only a few nurses, paid by the educational authorities, the selection may be made by the superintendent of schools, the board of education, or its committee on elementary schools. Where the health department has the

supervision, the appointment is made by the director or the health officer. It is inadvisable to have the supervision of nurses and of physicians under different departments, as it admits of lack of coöperation and probable friction.

In cities employing a large corps of nurses, and where not specified by law, considerable annoyance and responsibility can be saved for the appointing power by utilizing eligible lists from civil service examinations. To obtain the most efficient help through such examinations, the questions must be practical and pertaining to the duties of the position. The averages, however, must not be based solely on the answers; due credit should be given for previous experience and training, as well as for judgment, tact, and personality judged by personal interviews.

Where civil service lists are not used, the person who makes the appointments may profit by considering the opinions of the chief or supervisor who is directly responsible for the work of the department.

When more than five nurses are employed, it is advisable to have a supervising nurse who should outline and superintend the work. She should be responsible for those under her and report to the chief inspector, and should preferably have served as a school nurse.

Qualifications.—A school nurse should be a graduate of a reputable training school and should have had one or two years of private work. Experience gained in visiting nursing is also of great advantage. Preference should be shown the nurse who seems to be interested in work of this character. School nursing requires gentleness, yet firmness, tact, perseverence, and resourcefulness. An efficient nurse is willing to be supervised and does not oppose criticism of her work. This quality is acquired by a good hospital training. The character and temperament

of the applicant as well as her physical health should receive serious consideration. A thorough physical examination should be required of all applicants for the position and cases eliminated where ill health is likely to result in repeated absence from work.

A knowledge of a foreign language, especially Italian, Russian, or German, greatly aids in obtaining results among foreigners. Conversing in their native language wins the confidence of parents unable to speak or understand English, and is a distinct advantage over the use of an interpreter.

One occasionally meets a nurse who adversely criticises the work of the physician or the teacher. This unfortunate trait or acquired habit, creates disloyalty and antagonism. While this assertion may seem unnecessary, the author knows of several instances in which such actions have been the undoing of an otherwise efficient nurse.

Duties of School Nurses.—Where a nurse conducts the medical inspection in lieu of a doctor, she examines the vision and hearing of the pupils, recognizes signs and symptoms suspicious of contagion or physical defects, and refers the cases to a dispensary or physician for confirmation of her diagnosis. Upon the recommendations of physicians she urges parents to have defects treated. She also combats uncleanliness and aids n the teaching of hygiene.

Nurses working in conjunction with physicians in school inspection are assistants to the physicians, aiding them in the physical examinations and procuring treatment for defects found. In class examinations, with the assistance of the teachers, she designates the pupils who should receive an early inspection by the physician.

After diagnosis the nurse takes full charge of the case and uses all available methods to have the parents obtain treatment. By home visits and school consultations she

establishes a better understanding and closer coöperation between the school and the home.

The function of the school nurse acting in the capacity of a social educator on public hygiene is of great importance.

Equipment of Nurses.—The school nurse should wear a regulation outfit, one which will at all times distinguish her in her work. A neat, plain, dark blue or gray dress made of linen, chambrey, or of other washable material is best. This uniform is of equal value, and serves the same purpose as a badge, assuring her entrance to the homes. She becomes known by her uniform, which even affords her protection when working in the tenderloin districts.

Nurses in uniform have gone with perfect immunity in neighborhoods where men would fear to enter. Here they have not only been welcomed, but notorious characters have led them to residences they were seeking.

In a few cities a special bag is provided for the nurses. These bags should not be too cumbersome, but large enough to hold a few drug supplies, instruments, and record cards. She should have a clinical thermometer, bandage, scissors, wooden tongue depressors, and applicators or toothpicks, medicine or eye-droppers, absorbent cotton, adhesive plaster, and safety pins. A few drugs should be carried in the bag, including aromatic spirits of ammonia, alcohol, tincture of iodine, tincture of green soap, bichloride of mercury tablets, and lysol.

Drugs should be placed in one- or two-ounce vials and plainly labelled. All poisons should bear a conspicuous "poison" label. Cotton, bandages, and gauze should be kept in a tin box. These bags should be frequently inspected for cleanliness and replenishing. Where there is a supervising nurse, inspections of outfits should be made at regular intervals.

At each school the nurse should have a closet in which to keep supplies, record cards, and literature. These closets should contain the things described under the medical inspector's outfit.

Methods of Work.—The work of the school nurse is performed in the schools, at homes, and in dispensaries. She should visit daily every school under her care, beginning with the first school soon after the opening exercises. In her box containing the record cards there should be two separate compartments, (1) containing new cases, and (2) cases under treatment. The nurse should go to the principal's office, announcing her presence and receive the cards of patients referred to her by the physician at his previous visit. She should then send for these children, taking usually one, but not more than two or three from the class-room at a time, and treat or instruct each case in a room set aside for her work. When finished with a child, another case is sent for, using the child just leaving as a messenger, and so proceed until all the new cases are disposed of. Then the cases under treatment that need attention that day are sent for. The same system in sending for the children applies with these cases, and the work should be planned so as to finish with the pupils of one class-room before taking up the next. This creates less confusion and annoyance to the teachers.

If a child is to receive instruction regarding uncleanliness of head or body, such instruction should not be given before another child, unless there are a number of pupils requiring the same instructions. When preparing a printed circular of instructions to be carried home to parents, the nurse should fold the circular and place in an envelope, thereby respecting the feelings of the child.

If a parent's attention is to be called to an existing defect, one of the following cards should be used.

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES.
BUREAU OF HEALTH.

Division of School Inspection, Room 712, City Hall.

Mr.....

Dear Sir:—This is to notify you that .....,
a pupil in the .....School, is in need of medical attention for .....
..... You are advised to consult a physician, hospital, or dispensary without delay.

Very truly yours,

Philadelphia,.....19..... .....
Medical Inspector.

There is no advantage in having separate notification blanks for the various defects. If this simple form does not arouse the interest of a parent to the point of action, other steps must be taken.

Before resorting to a visit to the home, the nurse should send by the child a request for the parent to come to the school. These visits are termed "school consultations." A parent may be notified to call at the school in the interest of the child, and a time set which is convenient to the nurse, by using the following form. The card should not specify any particular disease, and should be signed by or with the name of the principal of the school. A request from

the principal will bring a quicker response than from the physician or nurse.

.....School District, No..... .....191....

Mrs.....

.....

Dear Madam:—Your child, ..., has been found by the medical inspector to be suffering from defects which greatly interfere with his / her work at school.

Kindly call at the school on.....at.....o'clock, in order that we may explain to you what can be done to help her. / him.

This is very Important.

.....

Principal.

At school consultations, the nurse should be tactful in her manner of informing parents of the existence of certain defects in the child. Little is accomplished by exaggerating the dangers from an unattended disease: it not only frightens the parent, but if the physician to whom the child is eventually taken belittles the physical ailment, the parent loses confidence in the nurse and school inspector. Instead of saying a child is backward due to a physical defect, the nurse should emphasize the fact that the child may learn more readily and with less exertion if the defect were corrected. Most parents resent being told that their children are mentally dull. It is also advisable not to use medical and other scientific terms in explaining the illness of the child. Such terms are not generally understood by the public, and, by confusing them, tend to defeat the purposes of the consultation. The nurse should avoid arguments regarding

a diagnosis, as these also tend to jeopardize any favorable impressions that may have been made. If the parent seems refractory and unwilling to act upon suggestions, the teacher or principal may be called upon to aid in accomplishing the object of the visit.

Should the parent neglect to call at the appointed time, the nurse should not censure the child or send threatening communications to its home. The proper way is to learn the reason for the parent's absence. If it is the child's mother, she may have been detained by the care of an infant or other home duties, or the time appointed may have been inconvenient. If the child's excuse for the parent warrants, list the case for a visit to the home. There are few cases, where the parent calls at the school to inquire what is desired, which fail to receive prompt attention.

A parent may be willing to have the child treated, but pleads lack of funds to pay for services and lack of time to spend at dispensaries. In such cases the nurse should offer her services and request the parent to sign a card granting her permission to obtain any necessary treatment. The accompanying blank is for this purpose:

.....191.....

To the Principal,

.....*School:*

I hereby authorize the School Nurse to take my child

.....

to an institution to have her / his physical defects properly treated.

.....

Parent's Signature.

.....

Residence.

This authorization in writing relieves the nurse from any responsibility or blame for proceeding to have the child

FIG. 2

Nurse's outfit in school.

treated, and protects her in case a parent should deny having given permission.

Even with one of these permits properly signed, the nurse should never consent to a serious operation at a hospital without again consulting and obtaining the written consent of the parent.

The nurse should always encourage the consultation with the regular physician of the family, and only upon evidence of poverty should dispensaries or school clinics be advised. Parents desiring to avail themselves of the services of a dispensary should be told by the nurse the location of the nearest one and the clinic hours for the disease to be treated. She should arrange one or two afternoons each week to take cases to the dispensaries and school clinics.

After disposing of all the old and new cases, and time permits, the nurse may make a preliminary inspection of the pupils in one or more class-rooms. Where there is no physician to perform class-room inspections, the nurse may utilize these opportunities to discover children with physical defects, but where her work supplements that of the physician, she should select a class not recently examined by the physician and adopt the following procedure: Without disturbing the exercises she should walk slowly up and down each aisle, observing each child for cleanliness or eruptions on skin, suspicious of contagion. Having noted the names of the children, those requiring immediate attention are sent for and the others are called at the next visit.

The nurse should divide her morning hours so as to allow a stated period of time to each school. When one of these periods is completed she should proceed to the next school on her route and perform the work in the manner outlined above.

A certain number of visits to homes are needed to make

the work effective. These visits are made after school hours and on Saturdays, unless there are many visits, when part of the afternoon session can be used for this purpose. At the homes the nurse should observe the building and social conditions, and should suggest remedies for unsanitary conditions where needed. In this way the nurse becomes the social visitor and should acquaint herself, where possible, with existing poverty. She should be able to decide when a case is worthy of free medical services, also when glasses should be furnished free by the city. It is necessary at times to devise ways and means for obtaining a brace, a high shoe, or other appliances to correct a deformity. In order to be of most help in such cases, the nurse should know all of the charity agencies and what functions they perform. Coöperation with available organizations is a great aid in the work.

It is impossible to give the details of procedure for each of the many circumstances that may arise, but a resourceful nurse always finds the remedy. The experiences of most school nurses have shown that opposition is the exception, not the rule.

To gain the confidence and friendship of the mothers is the key to success, and many seemingly hopeless cases have yielded to persuasion and kindness.

The following cases are not treated at school, and should be excluded:

1. Contagious eye diseases with symptoms of acute inflammation or discharge.
2. Contagious skin diseases with extensive lesions.
3. Pediculosis with live pediculi.

The following cases are allowed to attend school while under treatment by a private physician, dispensary, or school nurse:

1. Acute conjunctivitis.
2. Pediculosis with nits but no live pediculi.
3. Skin diseases including ringworm of scalp, face, or body; scabies (if gloves are worn); impetigo and avus.
4 Trachoma if there exists no acute inflammation or discharge, and the case is under constant treatment Cases of trachoma should not be treated at school.

The nurse should adopt the following methods of treatment at school:

Pediculosis: The child is given a circular containing printed instructions, and he is to report to the nurse on the following day, when she can readily see if the instructions were carried out.

Instructions to Parents on the Care of Children's Hair and Scalp.

Children affected with vermin of the head are excluded from school. The following directions will cure the condition:

Mix one-half pint of sweet oil and one-half pint of kerosene oil. Shake the mixture well and saturate the hair with the mixture.

Then wrap the head in a large bath towel or rubber cap so that the head is entirely covered; the head must remain covered from six to eight hours.

(Tincture of larkspur may be used instead of oil mixture. The directions for use are the same.)

After removing the towel, the head should be shampooed as follows:

To two quarts of warm water add one teaspoonful of sodium carbonate. Wet the hair with this solution and then apply castile soap and rub the head thoroughly about

ten minutes. Wash the soap out of the hair with repeated washing of clear warm water. Dry the hair thoroughly.

NITS: If the head is shampooed regularly each week, as above described, it will cure and prevent the condition of nits.

Impetigo: Remove crusts and clean parts with tincture of green soap and apply ammoniated mercury ointment or an ointment of zinc oxide.

Ringworm of face or body: Clean with tincture of green soap and apply collodion.

Ringworm of scalp: Clean with tincture of green soap and apply an ointment containing tar.

Conjunctivitis: Instillations of a solution of boric acid—ten grains to one ounce of distilled water. If there is any mucopurulent discharge instil one drop of a twenty-five per cent. argyrol solution.

Blepharitis: Rub on eyelashes an ointment of yellow oxide of mercury, two grains to one ounce.

Scabies: Should not be treated at school, but parents should be shown how to properly apply sulphur ointment. Three applications on successive nights at bedtime is sufficient. All clothing and bedclothing must be thoroughly boiled to prevent reinfection.

Wounds: Thoroughly cleansed with a bichloride or other antiseptic solution and a dry sterile dressing applied.

Emergency cases should be treated as the occasion requires, and if serious the child should immediately be sent home. Vomiting should suspicion scarlet fever or other infection. All cases suspicious of contagion (acute infectious diseases) should be immediately reported to the inspector of contagious diseases.

The Value of School Nurses.—The need of trained nurses for school inspection has become apparent in most cities

where physicians alone are employed. Records and statistics, wherever the system has been tried, show the effectiveness of the nurse in obtaining treatments and results. It has proved vastly superior to the many methods in use previous to the employment of school nurses, and has brought about a spirit of coöperation on the part of parents, much more effectively than the old practice of written notices and exclusions. Conflict and misunderstanding between the physician, school, and home has been replaced by confidence.

Repeated suggestions have been made to enact a law which would provide a penalty for failure of a parent to obtain necessary treatment upon the recommendation of the school physician. However, should such laws be enacted, it is questionable whether they would not be declared unconstitutional. Where an efficient system of school nurses has been established, the results will be equivalent to those which could be expected under possible legislative enactment. History proves that laws are not the "cure-alls" to all shortcomings and needs, and less faith should be placed in their action. This is not surprising, for often persuasion and reasoning succeed in accomplishing things which the laws cannot. In the author's opinion, any legislature which will make it mandatory for cities to employ both physicians and nurses for the schools, will save itself the need of any further legislation on this and many other subjects pertaining to public health.

The following information gathered by the Department of Child Hygiene of the Russell Sage Foundation of New York is as interesting as it is disappointing.

Cities Employing School Nurses and Number of Nurses Employed.

Division.	No. of cities having nurses.	No. of nurses.
North Atlantic	39	242
South Atlantic	4	10
South Central	2	2
North Central	21	96
Western	10	21
United States—Total	76	371

This seems like a rather disappointing report, but previous to 1907 but eight cities in this country had school nurses, and about two-thirds of those now possessing them have awakened to such needs and established them in the past year. You will note that seventy-eight per cent. of these cities and over ninety-one per cent. of the nurses are distributed in northern cities. This is not so strange when you consider that comparatively few of the Southern cities have medical inspection.

The true and ultimate objects of medical inspection of schools are safeguarding the health of the pupils and improving their physical and mental condition by removing those defects that interfere with the child obtaining a normal education with comfort. Medical inspection without nurses is largely one of records and statistics, while with nurses it means action taken and results obtained. No amount of talk can give more convincing proof of the absolute need of school nurses than the following comparative study of the results obtained by medical inspectors with and without nurses:

City of Philadelphia.

RESULTS OBTAINED BY A MEDICAL INSPECTOR WHEN NOT AIDED BY A NURSE.

Individual children reported upon. No.	Cases needing treatment reported upon as terminated. Kind.	No.	Results reported. Action. No.	Action. Per cent.	No action. No.	No action. Per cent.
751						
	Defective vision. . .	272	70	25.8	202	74.8
	Hypertrophied tonsils .	338	62	18.4	276	81.6
	Adenoids.	36	5	13.9	31	86.1
	Defective teeth . . .	152	31	20.4	121	79.6
	Totals . . .	798	168	21.1	630	78.9

RESULTS OBTAINED DURING THE SAME PERIOD BY THE SAME MEDICAL INSPECTOR WHEN AIDED BY A SCHOOL NURSE.

Individual children reported upon. No.	Cases needing treatment reported upon as terminated. Kind.	No.	Results reported. Action. No.	Action. Per cent.	No action. No.	No action. Per cent.
704						
	Defective vision. . .	441	355	80.5	86	19.5
	Hypertrophied tonsils .	104	68	65.4	36	34.6
	Adenoids.	62	45	72.6	17	27.4
	Defective teeth . . .	150	138	92.0	12	8.0
	Totals . . .	757	606	80.0	151	20.0

RESULTS OBTAINED BY MEDICAL INSPECTOR AIDED BY A NURSE.

School.	Nurse.	No. of recommendations.	Recommendations acted upon.	Recommendations not acted upon.	Per cent. acted upon.
1.	Nurse	324	262	62	80.86
2.	Nurse	445	434	11	97.53
3.	Nurse	320	282	38	88.12
4.	Nurse	265	226	39	85.28
Total	Nurse	1,354	1,204	150	88.90

RESULTS OBTAINED BY MEDICAL INSPECTOR NOT AIDED BY A NURSE.

School.	Nurse.	No. of recommendations.	Recommendations acted upon.	Recommendations not acted upon.	Per cent. acted upon.
5.	None	283	83	200	29.32
6.	None	582	152	430	26.12
7.	None	441	94	347	21.31
8.	None	474	91	383	19.2
Total None		1,780	420	1,360	23.6

The following is a report of the work of the school nurses of Philadelphia for the year ending December 31, 1910:

City of Philadelphia.

Number of schools		39
Number of nurses		9
Number of old cases		42,869
Number of new cases		16,341
Number of cases cured		10,969
Number of visits to schools		5,108
Number of visits to home (old)	3,096	
Number of visits to home (new)	1,928	
Total number of visits to homes		5,024
Number of visits to dispensary (old)	3,139	
Number of visits to dispensary (new)	2,007	
Total number of visits to dispensary		5,146
Number of school consultations (parents)	754	
Number of school consultations (pupils)	2,687	
Total number of school consultations		3,441
Number of school consultations (pupils)		2,687
Number of examinations for uncleanliness		30,099
Number of examinations for Bureau of Municipal Research		737

DISEASES FOR WHICH PUPILS WERE TREATED, SCHOOL, HOME, AND DISPENSARY.

Diseases.	No. of cases.	No. of patients cured.	
Defective vision	1,656	1,217	glasses—1,028 pairs; number of examinations for glasses not required, 189.
Corneal ulcer	4	7	
Conjunctivitis	379	350	
Glass eye	...	1	
Cataract	...	1	(removed).
Other diseases of the eye	296	306	(5 operations).
Defective hearing	43	26	
Otorrhea	64	67	
Other diseases of the ear	71	55	
Hypertrophied tonsils	768	443	(211 operations).
Adenoids	119	80	(28 operations).
Defective speech	29	13	
Other diseases of the nose and throat	387	491	
Pediculosis	6,376	3,108	
Eczema	599	578	
Pustular dermatitis	124	109	
Impetigo	193	159	
Ringworm	206	192	
Scabies	69	55	
Wounds	1,841	1,462	
Other diseases of the skin	1,315	991	
Scoliosis	5	7	
Hip-joint disease	...	1	
Other orthopedic diseases	33	29	1 brace and shoes obtained; 13 sent to gymnasium; 1 operation.
Teeth	828	479	
Malnutrition	142	129	89 sent to country.
Nervous	30	22	1 sent to epileptic hospital; 2 sent to country; 1 sent to Spring City; 2 old cases admitted to Oakbourne Home.
Mentally deficient	2	...	
Tuberculosis (two suspected tuberculosis)	4	1	(sent to country).
Trachoma	52	49	
Miscellaneous	706	541	
Total	16,341	10,969	

The school nurse has opened a path to the development of an ideal system of betterment of public health in our cities. The school nurse of the future will be the municipal nurse, whose duties will include not only protecting the health of the school children, but also caring for infants, teaching mothers their hygiene and proper feeding, thereby reducing a great and unnecessary mortality. By improving housing and living conditions, she will reduce the mortality from tuberculosis, pneumonia, and other preventable diseases. She will be the supervisor of health and sanitation in the factories as well as a teacher of hygiene to the children at school and to their parents at home. She will be the connecting link between the destitute family and the numerous organizations dispensing aid. With a small district assigned to a nurse in which she is held responsible for the health of every person and sanitation of every house, results can be obtained which would be impossible by any other system. The school nurses of the future are destined to be the guardians of our public health.

SYSTEMS OF INSPECTION.

Various bad features are noted in the systems employed in the different cities. Some cities are hampered by a law which permits the doctor and nurse supervising only contagious diseases. This prevents them from recommending or treating some of the most important ailments of school children, such as defective vision or hearings, enlarged tonsils and adenoids. Some cities have too few doctors and nurses to attend to the work, or the allotment of territory is poorly arranged. Consideration must be given to the distances between schools, and the kind of and not

number of population in a district. A nurse or doctor can attend to more schools in a section of a city inhabited by the higher social classes than the doctor who attends the schools among the congested and foreign element. In some schools the physician may see no more than a half dozen patients a month, whereas in the district of poorer people each school may send daily from twenty to fifty patients. School population is not a safe guide by which to allot the work. Sometimes a small annex with one hundred children takes as much time to inspect as a school of one thousand pupils.

Through a lack of understanding of the duties of the doctor and nurse, in some schools there is a waste of valuable time disposing of trifling wounds, etc., when the same time could be used for more important examinations. There is no need of a teacher sending to the inspector the same child with the same ailment each day, and the nurse should judge when she desires the doctor to again see the patient.

Instead of examining and reëxamining normal children, every new child should receive a thorough physical examination on being enrolled.

There are almost as many different systems employed as there are cities in which the work is performed. In considering the adoption of a system one must be mindful of the duties of the inspectors, which should embrace:

1. The detection of contagious diseases, thereby protecting the child and the community.

2. The detection of physical defects, which may prevent the child from acquiring an education, and the correction of these defects which may add to his physical and mental development.

3. To find the capacity of the individual child to acquire knowledge in accordance with his mental and physical status.

4. To insure the best possible hygienic surroundings for the child while he is in the charge of the school.

5. To bring a closer relationship between the school and the home; to carry out more successfully the other aims of medical inspection and insure treatment for defects.

6. To teach hygiene and healthful living that may be practised at school and home.

To accomplish all of the above objects of medical inspection, trained physicians should be employed. The examinations made exclusively by nurses or untrained and uninterested inspectors are often incomplete, inaccurate, and of slight value, and little information is secured that is of use to the teacher in the education of the child.

Where the physicians are required to attend both morning and afternoon sessions, the morning may be employed in examining cases of suspected disease and defects found by teachers and nurses, and the afternoon utilized for complete physical examinations of the pupils. This should progress with sufficient rapidity, so that every child shall receive such an examination at least once a year.

Class-room examinations of all the pupils are necessary after finding a case of contagion. These examinations are also of value in making a preliminary survey of the defects existing in a school.

Class-room inspections are conducted as follows: The physician stands with his back toward a window and the pupils pass in front of him in single file. At his side are the nurse and teacher of the class. Each child as it approaches the physician with outstretched hands and head elevated to give a full view of face, turns hands to show both sides.

The physician quickly observes the face for eruptions, sore eyes, discharge from ears or nose, enlarged glands, etc.

The child is instructed to open mouth wide and say, "Ah! Ah!" This gives a fair view of the throat for condition of tonsils and uvula and also condition of teeth. Hands are inspected for peeling or eruptions. While the doctor

FIG. 3

Class-room inspection.

is busy with these observations, the nurse glances at hair and scalp for vermin and observes the condition as to general cleanliness.

The teacher, supplied with paper and pencil, notes the name of any child to whom the doctor calls attention and places after the name a number given by the physician. These numbers represent a code easily remembered by the physician.

1. Head and scalp.
2. Eyes.
3. Nose.
4. Throat.
5. Ears.
6. Skin.
7. Uncleanliness.

X. Special, meaning an important case requiring immediate attention, such as a suspicious contagious disease. The physician collects these lists as he leaves the class-room, and upon returning to the room set apart for his examinations sends for these cases, several at a time, and makes a more thorough examination to confirm the diagnosis, and gives instructions.

This system is employed in a number of cities, and its effectiveness depends upon the skill of the physician in quick and accurate observations. No two men would obtain the same results with the same pupils, and the method is useless for final diagnosis. Children with suspected ailments must be noted or taken out of line and given a more thorough inspection.

In communities where they depend upon teachers to send the inspector to cases they believe require the attention of the physician, there is the disadvantage of relying upon individuals with inexperience and limited knowledge in detecting cases. One teacher may send great numbers of cases that are unimportant and cause needless waste of the physician's time; while others may send none, often overlooking children suffering from contagious diseases or gross physical defects.

Physical examinations, or what are termed in some cities, "individual examinations," are conducted for the purpose of detecting any variations from the normal that

may interfere with the health, growth, and development of the child. Some cities have laws or rules which forbid the physician touching the child during an examination. This is absurd in many respects, as medical authorities know the impossibility of detecting conditions of nose and throat, eye diseases, such as trachoma, chest diseases, such as tuberculosis, or defects of heart, without touching the child. Some authorities contend that the duties of the physician are only preliminary to a more accurate diagnosis by family physician or dispensary. This may be true, nevertheless it results in the recommendation of many cases for examination which later prove normal. Furthermore, these mistakes, due to snapshot diagnosis, often cause ill-feeling with parents, and also give to parent, teacher, and attending physician the erroneous impression that the medical inspector knows very little about medicine. It lessens the confidence in the school physician and is detrimental to the reputation of municipal work.

Cities vary in the frequency of visits required of their inspectors; some stipulate daily visits, while others twice a week or weekly. This question should be governed by the class of school population. The need of daily inspection or visits depends upon the number of cases referred to a physician in each school. In the same city those schools that care for children of the foreign population and tenement district should be visited daily, while those in better sections may require but two or three visits per week.

In estimating the work performed by medical inspectors, the amount of time spent, the number of schools visited, or the number of pupils seen is no criterion. Great distance between schools may mean that the major part of time is spent in travel. One inspector may accomplish more in one hour, due to better training and ability, than another

in three hours. Great numbers of pupils examined and few defects discovered and remedied mean little progress to the work.

In Philadelphia at the opening of schools in September, and again in January, the inspectors make a complete and exhaustive report of the sanitary conditions of school buildings, and defects noted are referred to the Board of Education. Then all new pupils recently admitted are examined for evidence of successful vaccination.

By the act of legislature in Pennsylvania, "The medical inspectors shall at least once each year, inspect and carefully test and examine all pupils in the public schools of their districts, giving special attention to defective sight, hearing, or other disabilities and defects specified by the Commissioner of Health in his directions for the medical examinations of schools."

"The medical inspector shall at least once a year, and as early in the school term as possible, make a careful examination of all privies, water-closets, urinals, cellars, the water-supply and drinking vessels, and utensils, and shall make such additional examinations of the sanitary condition of the school buildings and grounds as he deems necessary, or as the regulations of the State Department of Health or the rules of the board of school directors or of the local board of health requires."

RECORDS AND SYSTEMS OF RECORD KEEPING.

Much of the success of school medical inspection, its administrative control, results obtained and tabulation of statistics of value depend upon the records and system of record keeping. It is to school inspection what book-keeping is to a merchant.

Records are needed for the carrying on of the present work, the index of our activities and results, and the guide for future work. Medical inspection involves responsibility of several classes of workers, the doctor, the nurse, the teacher, the principal, and the parent. Each has special and individual responsibilities which coalesce, and each must assume his part to assure success. The records and system employed are the medium of coöperation between all parties.

The records are needed in compiling and tabulating weekly, monthly, and annual reports, and also in compiling statistics of value to ourselves and others to extend and improve the activities.

While there are occasional attempts of uniformity in performing the work, few cities use the same system of records. The greatest progress will be attained when most of the cities and towns having school inspection will adopt a uniform system. Work and results may then be compared to the benefit of all cities. Some copy the forms used by others, adding new ones, and a few discarding part of the system copied. Forms are often adopted without a knowledge of their practicability. Many cities change their forms frequently, showing the present undeveloped condition of many systems. To enumerate and reproduce specimens of the forms used by various cities would require a volume and tend only to confuse the reader as to which are good and which are faulty. For our purpose it will suffice to enumerate some of the bad features of some of the systems.

Some cities have entirely too many forms, often duplicating clerical work and complicating the system, and simplicity is seldom the keynote. To some cities the expense of printing forms is no small item. Many of the blanks are

long on columns and short on information of actual value. The number of medical, sociological, and pedagogical questions which may be asked are unlimited, but the records should contain such information which is of practical value in deciding what action to take in the average case. It is undesirable and unnecessary to have a separate form to meet each emergency. The doctor and nurse frequently recording the time consumed in the performance of each duty is of little value, and such blanks are designed more for keeping tabs on the doctor and nurse than on the pupils. Complete and accurate records are necessary, but it is useless transcribing the same information a number of times. When fifty or seventy-five per cent. of the physician's time is needed for clerical work, it would be economy to furnish him with a clerk.

One city uses five distinct and separate forms for each case, one for the teacher, which remains in the school as a permanent record, one for the nurse, one for the health department, one for the parent, and one for the medical inspector. Aside from the unnecessary expense and waste of time, such records cannot be referred to intelligently. Duplicate copies made by the use of carbon paper while saving time admits of copies which blur and cannot be kept for permanent records. All forms which are referred to frequently should be printed on card-board and not on paper. All information which is of value to the work should be recorded, on one blank, arranged and filed in a manner to be available at a moment's notice.

Systems of record keeping in some cities are so faulty that they are useless when compiling statistics. Annual reports may show the number of examinations of children, but not the number of children examined; hence, percentages of defects found cannot be estimated.

A preliminary survey of a school of two thousand taken while the pupils pass in front of the inspector, the entire work taking one hour, should not be recorded as two thousand examinations, and as often happens, included with, say ten individual thorough examinations, taking three hours, but should be recorded as so many classes examined.

Diseases and defects among the pupils are obtained from three sources: (1) Detected and sent by the teacher, (2) class-room inspections, and (3) individual examinations. There is no need for a separate blank to record the cases from each of these sources. The teacher in surveying her class each morning before beginning her exercises, should recognize the pupils requiring the attention of the attending physician, and note the name of child, class number, and reasons for referring to the doctor. The physicians record the diagnosis and recommendation on the same blank and passes the card on to the nurse. Defects found by class inspections or individual examinations may be recorded on similar forms.

Defects which may influence the education of the child should be transferred to the card used to record the child's school attendance and progress. This report card should follow the child through the various grades and schools.

After studying the various systems of medical inspection, as employed in a number of cities of the United States, and eliminating the useless and unpractical features, the author devised a system of inspection which has met all of the requirements for a simple and practical system. Gulich and Ayres, in their *Medical Inspection of Schools,* commends this system, and much of it has been adopted in Philadelphia and several other cities. While the blanks were devised for schools employing doctors and nurses, it is equally applicable to those having only physicians.

In devising the system, the chief factors considered were: (1) The elimination of useless clerical work; (2) methods which would assure coöperation between the medical inspector, nurse, principal, teacher, and parent; (3) the avoiding of unnecessary exclusion of pupils, and when excluded, their return in the shortest possible time; (4) the assuming by each party of his or her share of the responsibilities, so errors or derelictions may be traced to their source; (5) records and reports to be as few as possible, to afford simplicity, practicability, and easy reference at all times.

The system comprises the use of but one card, which is used to refer all cases and serve as a record for recommendations and actions taken. Some of these cards are in each class-room, and the teacher answers the questions and information desired on the upper part of the card, and sends it with the pupil to the inspector. This may seem to add more clerical work on the already overworked teacher, but it has been proved to save her time, trouble, and responsibility. Many of the younger pupils do not know their names, addresses, and number of classroom, much less why the teacher sent them to the doctor. The return of the pupil to its teacher requesting the desired informations means loss of time and the answer eventually sent upon any scrap of paper requiring copying by the doctor and nurse. The teacher filling the cards out before beginning her session's work, avoids the unwise plan of asking, "Who wishes to go to the doctor?" with a ready response from shiftless pupils who desire an excuse for leaving the class. The teacher personally observes who should be sent to the physician, and states on the card the reason for sending the child and avoids many cases of imposition.

Form for recording defects. Tab to be returned to teacher.

To Teacher—

This child is referred for treatment to

Nurse.
Dispensary.
Family Physician.

This child is.....excluded from the classroom until you receive notice for his (her) return.

Medical Inspector.

School.....Teacher.....Room No.....
Name.....Address.....
Date.....Sent to Medical Insp. for.....

Diagnosis.....
Referred to physician—Dispensary—Nurse.
Excluded—Date.....Returned.....
Treatment by nurse—at home—at school.
Dates of treatment—
Total number of treatments—
Results—Cured
Improved
Not Improved

Nurse Medical Inspector.

The above report cards can be printed on two different colors of card-board. Blue cards for cases recommended for treatment; yellow cards for cases excluded for contagious diseases. By this distinction in colors, one can readily refer to the excluded pupils and follow them up to have the children returned at the earliest possible date.

In schools having a system of bells, the physician on visiting the school rings the bells on each floor a number of taps, which informs the teachers of his presence. Immediately the children are sent to him with their respective cards. In schools having no bells, each morning the teachers send to the principal's office the cards of the children to be examined, and the inspector sends to the classes for these pupils. The diagnosis and disposition of the case are written on these same cards, which are kept in the office. Each pupil sent to the inspector for examination receives one of the following slips to take back to his teacher:

To Teacher—

This child is referred for treatment to

Nurse.
Dispensary.
Family Physician.

This child is.....excluded from the class-room until you receive notice for his (her) return.

Medical Inspector.

When a child is excluded, it may be given a card similar to the following, to take home to its parents:

DIVISION OF SCHOOL INSPECTION.
DEPARTMENT OF PUBLIC HEALTH AND CHARITIES.
BUREAU OF HEALTH.
Room 612, City Hall.

Philadelphia,..... 19.....

Name ..... *Age*.....

Address.....

Is Ordered to Discontinue Attendance at

.....*School located at*.....

Reason .....

.....

Medical Inspector.

(See Other Side).

NOTICE TO PARENTS.

The disease mentioned on the other side of this card is a contagious affection and liable to be transmitted to other children. The child should receive prompt treatment by a physician (or at any dispensary), and should return to school ....., 19....., for reëxamination by the Medical Inspector of the Bureau of Health. If found free from contagion at this time, he may resume attendance at school.

Chief Medical Inspector.

On the tab returned to the teacher the doctor underscores whether the pupil is to go to the nurse, dispensary, or family physician for treatment, or whether excluded from the class. This admits of no mistake by the teacher, and aids her in knowing the exact nature and disposition of each case. The child cannot go home for the remainder of the day when he was instructed to wait for treatment by the nurse; and again, a child excluded cannot return to his seat in the classroom and the teacher remain ignorant of his exclusion by the

inspector. It admits of the principal having a full written record of the disposal of all cases sent to the doctor.

When the case is referred to the nurse, the doctor specifies on the card if the child is to be treated at home or at school, or both; also the treatment recommended. This concise written report makes mistakes impossible, and may prove valuable if legal or other questions arise. These cards are filed in the office in a box with three compartments: (1) New cases; (2) unfurnished cases; (3) cured cases. Each compartment is arranged according to the number of class-rooms.

The nurse on visiting the school, first takes all cards in the compartment of new cases and sends for each pupil individually. The information on the card makes it possible for her to perform all her work without troubling the principal or teachers. After attending to the new case and recording on the card the date of treatment, she replaces them in the cabinet in the compartments of unfinished or cured cases. The nurse now looks over the unfinished cases and sends for those requiring treatment and records the date. She so proceeds each day until the child is cured or the case otherwise terminated, when she records the date of cure, when the card is filed in the third compartment. Once a month all finished cards are sent to the Bureau of Health of Education, where they are filed in a cabinet according to school and disease. One can readily perceive how easy it is to refer to these records. For example, should one desire to know how many cases of defective vision were treated and obtained the necessary glasses, or the average number of treatments required at school to cure a certain skin disease, these facts may readily be obtained.

The physician and the nurse render to their superior officers a daily and weekly report of the work performed. These reports are tabulated from the individual record cards kept at the schools. The report should be filled in

each day and mailed to the chief inspector at the end of the week.

A form suitable for recording the work performed by the nurse each day and totaled for the week is herewith shown:

Report for Week Ending,----------191------

Nurse.

			M.	T.	W.	T.	F.	S.	Totals	Home	Disp'y	Cured
		Date										
Summary	Number of	Schools Visited										
		Old Cases										
		New Cases										
		Cured										
		Visits to Homes — Old										
		Visits to Homes — New										
		Taken to Disp'y — Old										
		Taken to Disp'y — New										
		School Consultations — Parents										
		School Consultations — Pupils										
Number New Cases Treated	Eye	Exams. for										
		Uncleanliness										
		Def. Vision										
		Corneal Ulcer										
		Conjunctivitis										
		Other Diseases										
	Nose-Throat Ear	Def. Hearing										
		Otorrhea										
		Other Diseases										
		Hypert. Tonsils										
		Adenoids										
		Def. Speech										
		Other Diseases										
	Skin	Pediculosis										
		Eczema										
		Pust. Derm.										
		Impetigo										
		Ringworm										
		Scabies										
		Wounds										
		Other Diseases										
	Orthop.	Scoliosis										
		Hip-joint Dis.										
		Other Diseases										
		Teeth										
		Malnutrition										
		Nervous										
		Totals										

School clinics, especially for some of the specialties, diseases of the eye, or nose and throat, have been inaugurated in several cities. These clinics are intended only for the treatment of school children whose parents cannot afford to obtain such services from a private physician.

To avoid dispensary abuse by free school clinics, each child should be investigated by the nurse or social visitor at its home to be assured that the parents cannot afford to pay. When a child is found to be a suitable case for free treatment, the nurse or medical inspector should fill in one of the accompanying blanks. One of these blanks properly filled in and signed by the nurse and principal is presented at the clinic when the child applies for treatment.

CITY OF PHILADELPHIA.

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES.

BUREAU OF HEALTH.

DIVISION OF SCHOOL INSPECTION.

Dental Dispensary,
Room 706, City Hall.

Philadelphia,.....191

This is to Certify that.....*age*.....
Residence..... *School*..... *Section*..... *Grade*.....
is in need of dental treatment and the parents are unable to pay for the same.

.....

Inspector.

.....

Principal.

Present this Certificate at Room 706, City Hall.

Office Hours: Monday to Friday, 9 A.M. to 4 P.M. Saturdays, 9 A.M. to 12 noon.

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES.
BUREAU OF HEALTH, ROOM 708, CITY HALL.

L. C. WESSELS, M.D., Ophthalmologist. *Philadelphia,*.....

This is to Certify that.....*age*.....
Residence..... *School*..... *Section*..... *Grade*.....
is in need of glasses and the parents are unable to pay for the same.

.....
Medical Inspector.

.....
Principal.

The medical inspector should when leaving a school, take an account of the work he performed that day. He should note a summary of the number of examinations, cultures, vaccinations, etc., also exclusions and diseases for which pupils were excluded, and recommendations for treatment. These items should be totaled at the end of the day and written on the "Weekly Report" sheet, which is to be returned to the central office. These notes may be kept on one of the weekly sheets, using a blank for each day and placing name or number of school in place of the day or week.

"Weekly Report" sheets should show a complete detailed history of the work performed. These reports are the only record which the supervisor has to scan each week to know the character and quality of work performed by the various inspectors. It is important that the supervisor should keep at his office a "blotter" or large sheet containing all of the columns recorded on a weekly report blank, and a space for each inspector.

MEDICAL INSPECTOR'S REPORT FOR WEEK ENDING _____

	Monday	Tuesday	Wednesday	Thursday	Friday	Total
SUMMARY. Schools Visited.						
Pupils sent to Medical Inspector.						
Class Room Insp., No. pupils exam.						
Individual Examination.						
Special Examination.						
Total Examinations.						
Cultures.						
Examination Vaccination.						
Vaccinations.						
Sanitation Inspections.						
Recommendations for Treatment.						
Exclusions.						
Exclusions Returned.						
Home Visits.						
School Consultations.						
EXCLUSIONS. Not Vaccinated.						
Contacts Contagious.						
Scarlet Fever.						
Diphtheria.						
Measles.						
Chickenpox.						
Whooping Cough.						
Mumps.						
Rubella.						
Suspic. Sore Throat.						
Trachoma.						
Ac. Conjunctivitis.						
Scabies.						
Impetigo						
Ringworm of Scalp.						
Ringworm of Body.						
Favus.						

FOLD HERE

RECOMMENDATIONS FOR TREATMENT

	Monday	Tuesday	Wednesday	Thursday	Friday	Total
Defect. Vision.						
Conjunctivitis.						
Other Diseases of Eyes.						
Defect. Hearing.						
Otorrhea.						
Other Diseases of Ears.						
Enlarged Tonsils.						
Nasal Obstruction.						
Other Diseases of Nose and Throat.						
Decayed Teeth.						
Defect. Speech.						
Impetigo.						
Ringworm of Scalp.						
Ringworm of Body.						
Eczema.						
Other Diseases of Skin.						
Wounds and Injuries.						
Malnutrition.						
Diseases of Chest.						
Diseases of Abdomen.						
Other Systemic Diseases.						
Mentally Subnormal.						
Scoliosis.						
Other Orthoped. Defects.						

District No.....

Inspector.....

The reports are transferred to this "blotter," where they can be added to find the total work performed by the entire corps during the week. It also serves to make comparisons of the work performed by each inspector. The chief or supervisor has formed averages for each disease excluded or recommended for treatment. He can study from these sheets the shortcomings of the men under his charge. He receives his suspicions as to where he should personally visit, observe and instruct to make the work uniform and effective.

When the individual record cards, which have been closed because the defects or diseases have been treated and cured, have been returned to the central office, they should be counted to see if they tally with the numbers reported by the inspectors.

The preceding form is recommended for a "weekly report" of the work performed by a medical examiner.

AUXILIARIES TO SCHOOL INSPECTION.

The medical and sanitary inspection of schools is not a problem for the physician alone, but requires the concerted action of all parties concerned. School authorities, principals, teachers, nurses, parents, and institutions allied to the medical profession, such as hospitals and dispensaries, must work harmoniously and add their quota to the work to accomplish results.

Teachers and Principal.—The interest manifested by the teachers and principal contribute greatly to the success of school inspection. Indifference on the part of a teacher may allow an epidemic of a contagion to spread by failure to recognize a sick child and in sending it to the inspector

for diagnosis. Thus poor results in teaching are obtained because pupils suffering from uncorrected physical defects are permitted to remain in class.

Coöperation between the school and the doctor depends largely upon the physician's diplomacy. He can do much to stimulate interest in his work by occasional talks at meetings of the teachers. On these occasions the physicians can train the teachers to recognize certain diseases and defects. Instructive talks by the principal will also awaken interest. Fortunately, few teachers and parents are now ignorant of the benefits derived from medical inspection, and many welcome the work. The antagonism exhibited by some teachers during the early days of medical inspection was mainly due to a mistaken idea that it would place additional work upon them, but when they found that the recognition of defects and their treatment eliminated many of the backward and unruly pupils and lightened their burdens, their indifference ceased.

Teaching of Hygiene.—The value of school inspections is measured by the results obtained and the permanency of the effects, not by the number of children examined and percentage of defects found. To correctly diagnosticate a defect or disease is the first step of medical school inspection; to recommend treatment is the next; and third, and most important, to have the defects corrected. Here the physician is dealing with parents of all temperaments, and only by the exercise of good judgment, tact, and diplomacy will he succeed in arousing some parental action.

Public hygiene and sanitation, of which school inspection is a part, aims not to cure disease but to prevent it. The best method of preventing sickness among school children is to teach healthful living. A part of all public health work must be educational, and the condition of good health will

be most marked where the people learn and practise the requirements of hygiene. The child must learn what causes certain diseases and how to protect himself and others. This knowledge is not only a lasting benefit to the pupil, but to those with whom he comes in contact at home and elsewhere.

FIG. 4

Teaching school girls practical hygiene and care of infants.

Every opportunity should be taken to teach practical hygiene in the class-room. Incorrect posture in standing or sitting should be occasion to explain to the class its dangers. Practical lessons at opportune times make lasting impressions and a certain number of hours each week should be devoted to the subject. Text-books should be selected

which are practical and written in an interesting style, that will appeal to a child. In the first grades, stories with hygiene lessons as their basis are instructive. Anatomy and physiology should always be illuminated with practical lessons on hygiene.

If the teeth are under consideration, the child should be taught the value of good teeth, the pain and discomfort with decayed teeth, the change in shape of the face through their loss, and how to preserve them. In a similar way the various parts of the body can be taken up. Instead of merely describing a bone of the spinal column, explain at the same time curvature of the spine and its causes.

The medical inspector when present at the time of a lesson in antomy, physiology, or hygiene may aid in the instruction.

School Text-books on Hygiene.—To insure good teaching, there must be good text-books. No other subject in the school curriculum has received such little attention by competent authors as practical hygiene. Hampered by rules of school boards, which govern the subjects written upon, the scope of the work, and the authors, who are seldom medical men trained in public health problems, little can be expected of the class of books published. The children should be systematically instructed in the principles of sanitation and hygiene according to their age and receptiveness. The text-books must be written in a simple manner, and suitable for school use. *Personal* hygiene is of more importance than general and public hygiene, and a study of rare diseases can be profitably omitted. Likewise, inadvisable are gross exaggerations of the evil effects of alcohol and tobacco, which ascribe every ill to which the body is heir to the use of these drugs. Hygiene should be designed as a progressive study, adapted to the varying

capacities of each class from the primary to those more advanced. The facts should be developed and advanced from grade to grade, always keeping within the limits of comprehension. The same truths repeated and gradually enlarged become part of the child's stock of intelligence; he learns, yet scarcely remembers when or how, and the lessons stick and influence his future life. To instruct, one must interest, and this is accomplished by well-written incidents from everyday life. Illustrations should be carefully selected to appeal to a child, and with a view toward helping to understand the text.

Parents.—There always will be a few parents who through indifference, ignorance, or neglect are unmindful of the physical needs of their children. Nothing has encouraged cooperation between home and school more than medical inspection of school children. The physician and the nurse with their home visits and school consultations have obtained remarkable results. The parents are shown that their children are not only receiving instruction in arithmetic and languages, but that the school authorities are interested in everything that concerns the physical, mental, and moral development of their charges. This interest on the part of the school, however, should not relieve parents of their responsibilities. Wherever possible they should do their share and be encouraged to render the assistance that is their duty.

Parents' meetings at the school, held in the evening when parents are free from home duties, are invaluable. Here the school physician can with interesting lectures accomplish much that will benefit the home and the children, and incidentally aid him in his work. If these lectures are illustrated by means of lantern slides, the public may be more readily instructed in the work performed by school

PLATE I

School Dental Clinic, Philadelphia

physicians, the protection against prevalent diseases and other public health problems.

Specialists.—Accuracy in diagnosis is needed to prevent spread of contagion. The physician, if in doubt regarding a suspicious case, cannot with impunity allow a child to remain at school while he watches the developments, nor can he wait twenty-four hours for the result of a culture to verify the diagnosis of a suspicious diphtheria. For these reasons some system should be adopted similar to that in Philadelphia which employs two experts as diagnosticians, to whom are referred all cases in which the medical inspector is in doubt as to the diagnosis. In the above city these services have proved of great value.

Special School Clinics.—In America little has been done to create school clinics, but abroad they are a feature of school medical inspection. In this country, eye and dental inspections are the only clinics held directly in connection with school work. Sixty-nine cities in the United States have inspections conducted by dentists, most of whom give their services gratis, but several cities including New York and Philadelphia have dental clinics as part of school inspection. Philadelphia has a corps of paid dentists who devote time every day to the school children at a clinic fitted out at the City Hall, and two clinics in downtown schools. This city also has a clinic in the same building in charge of a competent ophthalmologist for the examination and treatment of the eyes.

Dispensaries and Hospitals.—It is evident that dispensaries and hospitals are necessary adjuncts to the physician's work in the schools. School medical officers in most cities are forbidden to treat any child attending the schools under his supervision. This is a wise ruling, as it prevents the possibility of abuse of power and interference in the

work of attending physicians. All patients are referred to their parents or guardians, to be taken to their family

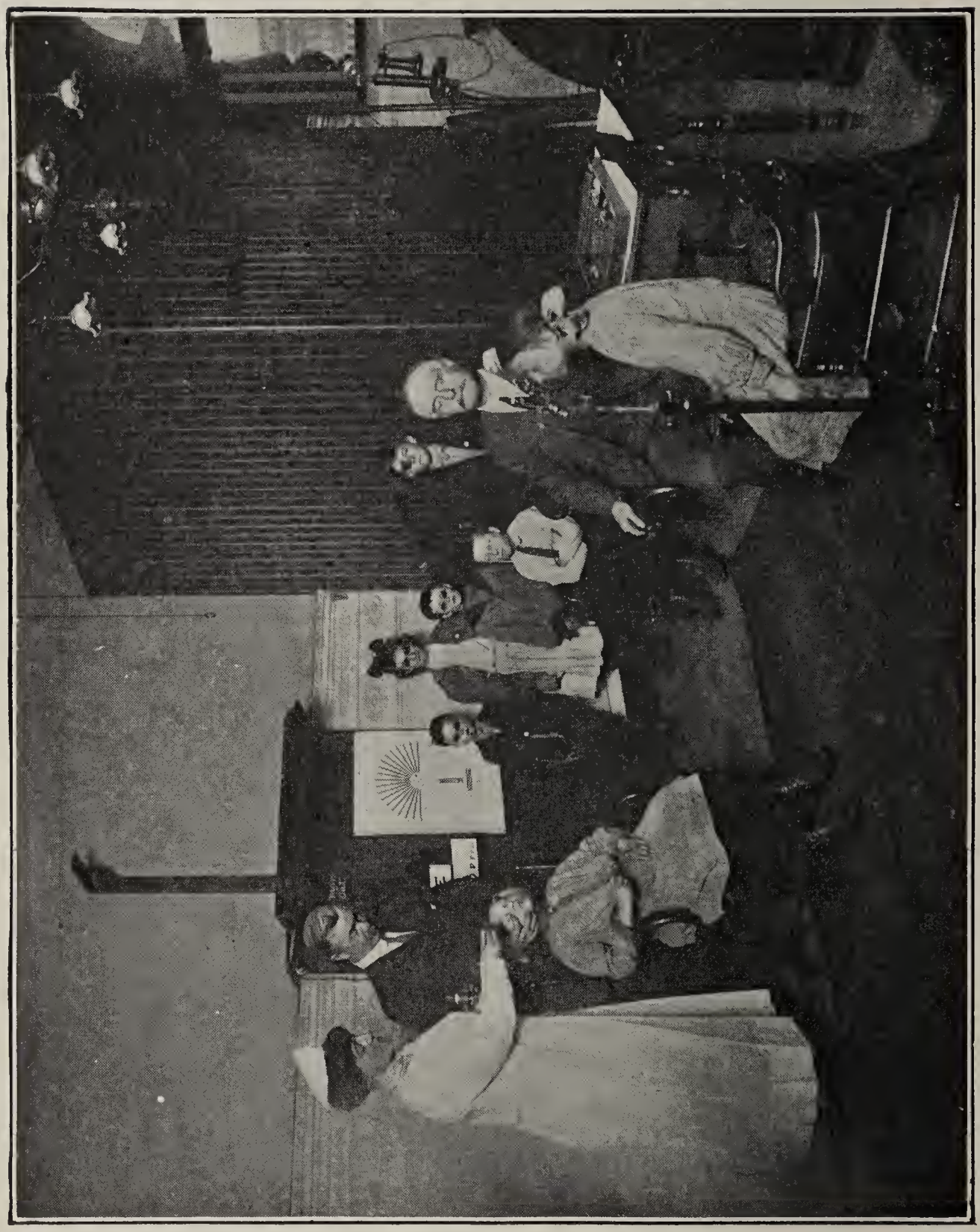


FIG. 5

School eye clinic in charge of ophthalmologist, Philadelphia.

physician, or if too poor, to a dispensary. The school doctor and nurse must be informed of the dispensary hours

for the various specialties at the different hospitals. Where clinic hours interfere with school sessions, arrangements can be made with some hospitals to have special clinics after school.

Social Visitors.—Parental neglect, ignorance, poverty, and many social aspects must be studied constantly, because it is these conditions which make it difficult to arouse parents to take some action on recommendations of the school physician. The trained school nurse is the best solution of the problem. However, in some cities where nurses are not employed, social workers and visitors are of service. They can visit homes, interest parents in the necessity of giving proper treatment, and, where poverty exists, seek the aid of one of the charity organizations when necessary. In some cities the percentage of cases which receive treatment is but a small fraction of those recommended. This is oftentimes due to neglect to study social and home conditions and apply efforts in those directions.

While some States have compulsory examination of school children, no State or city has any law which compels a parent to act upon the recommendations of the physician. Irrespective of the non-existence of such statutes in cases of stubborn parents, much can be accomplished by the tactful trained nurse, the proper use of the Society to Protect Children from Cruelty, and the bureau of compulsory education. However, the two latter institutions should not be resorted to until all other means have been exhausted. In Pennsylvania the compulsory education laws cannot legally be used for this purpose, as the code states, "Any pupil prevented from attending school on account of the health or sanitation laws of this Commonwealth is hereby relieved from complying with the provisions of this act concerning compulsory attendance."

INSPECTION OF TEACHERS AND JANITORS.

The health of the teacher is of great importance to the public school system, in some respects even more so than the pupils under their care, and yet little has been done to assure by inspection a normal staff of healthy teachers.

Tacoma, Washington, has a law that excludes from school, teachers and janitors as well as children afflicted with tuberculosis. Pennsylvania has a similar section in its School Code, "No person having tuberculosis of the lungs shall be a pupil, teacher, janitor or other employee in any public school, unless it be a special school carried on under the regulations made for such schools by the Commissioner of Health."

A teacher or janitor with such diseases as tuberculosis, especially tuberculous affection of the throat, consumption, coupled with carelessness in spitting or uncleanliness, and syphilis in certain stages, may produce untold harm if unrecognized. There are other ailments which when possessed by a teacher while not communicable are detrimental to the education of the pupils. Extreme nervousness and irritability, whether due to general physical breakdown or some existing defect, is sure to give results which react on the pupils. Chronic laryngeal catarrh, defective hearing or vision and many other defects in the teacher should be recognized as of more importance than in a pupil.

The mere furnishing of a certificate of health to the board of education is insufficient, as there are some unthinking or unscrupulous physicians who for the sake of a fee may issue such a certificate to a teacher when they know she is suffering from some defect that may prove detrimental to the school.

In the State of Massachusetts the law says the medical inspector shall make "such further examinations of teachers, janitors, and school buildings as in his opinion the protection of the health of the pupils may require."

The School Code of Pennsylvania reads:

Section 1320. "No teacher's certificate shall be granted to any person who has not submitted upon a blank furnished by the Superintendent of Public Instruction a certificate from a physician legally qualified to practise medicine in this Commonwealth, setting forth that said applicant is neither mentally nor physically disqualified—by reason of tuberculosis or any other chronic or acute defect, from successful performance of the duties of a teacher; nor to any person who has not a good moral character, or who is in the habit of using opium or other narcotic drugs in any form, or any intoxicating drinks as a beverage."

The foregoing is evidence that a few States are alive to the importance of medical inspection of teachers and other school employees, and have taken steps to safeguard the pupils. The importance of a normal staff of healthy teachers cannot be emphasized too strongly, and any community installing a system of school inspection must necessarily provide some form of legislation to cover this point if the system is to be complete and efficient.

PART II.

THE SCHOOL BUILDINGS AND GROUNDS.

INSPECTION OF SANITATION.

An important part of medical inspection consists in the inspection of sanitation of school buildings and grounds. This is mandatory in some States, and the laws not only direct how such examinations shall be conducted, but also contain specific provisions for the erection of schools and planning of the school yards. One cannot teach hygiene and healthful living surrounded by unsanitary buildings in which to conduct classes. Attractive, well-ventilated, and well-kept school-rooms are in themselves an object lesson and an incentive for the pupils to try to live properly. For the medical inspector to recognize unsanitary conditions and faulty construction, he must be trained to know what is necessary to make a school building suited to the needs for which it was built. All defects must be properly noted and a report given to the authorities who have the power to remedy them.

Inspections should be made at least once a year, and oftener if required. The inspection should include every part of the building, including its drainage, plumbing, heating, ventilation, cleanliness, etc. All urgent repairs or unsanitary conditions found should be noted in a special

report, and a reëxamination made in a reasonable time to note what action has been taken. In some cities it may require a fearlessness on the part of the inspector to report certain shortcomings.

Measurements and calculations should be made showing the amount of air space per pupil and the amount of window and lighting space. These should be placed on a record blank for permanent filing in the health department or the Board of Education. With it might be filed a plan of the building furnished by the architects. This information when once properly and fully recorded and filed, need not be taken again unless some changes or alterations are made to the building or ground.

Reports must not be made on the word of teacher, principal, or janitor, but only by the personal observation of the inspector. While these authorities may call attention to defects which may otherwise be overlooked, all complaints should be verified by the physician.

The medical examiner should begin his examination by a thorough inspection of the grounds surrounding the school. The out-houses, water-closets, and urinals should be inspected for distance from building, ventilation, cleanliness, condition of plumbing and drainage, number of seats in relation to school attendance, and accommodations for small children. The kind and condition of paving on school grounds, the presence of any stagnant pools of water, playground facilities, and the amount of space per pupil should be noted.

The inspection of the building should include attics, basements, cellars, and all closets for cleanliness; also the kind of flooring in cellars, dampness of walls, presence of water, or accumulation of refuse and ashes. Study the kind and condition of the heating apparatus and the air intake,

also whether such conduits are properly screened. The absence of a cellar, with building directly on ground, may greatly affect the health of the children.

The inspection of class-rooms includes the measurement of each room to find the amount of air space allotted to each child and the amount of window space. The lighting should be studied in its relations to the pupils, and whether obstructed by adjoining walls. The seating of the pupils should be noted while the class is in session, as adjustable seats and desks may not be properly adjusted. The kind of desk and chair used should be noted in the report, also the temperature and humidity of each room and improvements where needed recommended.

Coat-rooms and toilets should not be overlooked. There should be a separate hanger for each child and the coat-rooms should be ventilated. The indoor toilets should meet the requirements of the children, and flushing and plumbing should be in perfect condition.

The water-supply is very important, and the source and purity should be investigated. If filters are used, they should be clean and in working order. The facilities for drinking and the use of individual cups or drinking fountains should be noted.

All observations should be immediately placed on a permanent record to be kept on file at the central office. It is surprising in how few cities the condition of school buildings is known.

REPORTS ON SANITATION.

The following is a good blank for reporting on the sanitation of school buildings:

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES, PHILADELPHIA
BUREAU OF HEALTH—DIVISION OF SCHOOL MEDICAL INSPECTION
RECORD OF INSPECTION OF SCHOOL PLANT.

WARD.....

DATE.....
SCHOOL.....
LOCATION.....

	PUBLIC		HIGH		RENTED	STONE		CEMENT	ERECTED (YEAR)	REMODELED (YEAR)
	PAROCHIAL		GRAMMAR		MAIN	BRICK		WOODEN		
	PRIVATE		PRIMARY		ANNEX	MIXED		FIRE PROOF		

| | | | | | | | | |

INSPECTION		TEMP. OF CLASS ROOM		GENERAL SANITARY CONDITION																WATER SUPPLY						ACTION OBTAINED				
DATE	BY WHOM (INITIALS)	MAXIMUM	MINIMUM	NUMBER OF CLASS ROOMS 68° TO 70°	BUILDING CLEAN	DAMP SAWDUST USED IN SWEEPING	TOILET PLUMBING IN WORKING ORDER	TOILETS EMIT OFFENSIVE ODOR	PRIVY WELL FULL	DISINFECTANTS USED	CELLAR DAMP OR OTHERWISE INSANITARY	NUMBER OF PUPILS IMPROPERLY SEATED	OF DIRT & REFUSE ACCUMULATION: CLASS ROOMS	OF DIRT & REFUSE ACCUMULATION: HALL WAYS AND CLOAK ROOMS	OF DIRT & REFUSE ACCUMULATION: CELLAR	OF DIRT & REFUSE ACCUMULATION: PLAY GROUNDS	OF DIRT & REFUSE ACCUMULATION: ADJOINING ALLEYS	WHAT MEANS FOR DRINKING	RAW (WELL)	FILTERED (CITY)	FILTERED (SCHOOL)	SCHOOL FILTER CLEAN	FIRE ESCAPE UNOBSTRUCTED AND IN GOOD CONDITION	DATE	REMARKS	REFERRED	DATE

These reports should be filed in the office of the health department and all changes should be noted and filed with the first report.

CONSTRUCTION OF SCHOOL BUILDINGS.

General Considerations.—The construction of a school building is beyond the scope of this work. It is considered here only in a general way for the purpose of helping the inspector to recognize those conditions that are unsanitary or detrimental to the health of the children. Details of arrangement of rooms and the division of floor space should be according to available space and the needs of the occupants. The basement, often neglected, should receive consideration as to flooring, possible contamination from sewer gas or dampness, ventilation and light. Roofs should afford protection against rain or snow, and against the heat in summer. Ample provision must be made for playgrounds.

It is essential that schools shall be built upon proper sites, and with due regard for adequate heating, lighting, and ventilation. There should be a sufficient supply of pure water, and the plumbing and drainage should be an approved sanitary system.

Buildings should preferably be two stories high, and when higher should be fire-proof. Where space admits, a school should contain besides its class-rooms and administration offices, assembly halls, physical training-rooms or gymnasiums, a room for manual training, sewing or cooking classes, and possibly a library. One of the rooms should be set aside for the work of the medical inspector and nurse. This room should be well-lighted and furnished with running water.

The basement should be two-thirds above street level, so as to allow plenty of light and ventilation. The entrance can then be located in this part of the building when desired. Lockers placed in basement would prevent rain and snow being tracked through the building in bad weather. The basement could also be used on rainy days for recess or it would serve as a location for toilets and other lavatory equipment.

The stairs should be wide enough to allow classes coming and going. The material for steps should be such as will not wear slippery or dusty. Railings should be constructed so as to be easily cleaned, the halls should be well-lighted and not dependent on light from class-rooms. Walls should be burlapped and glazed or of material that will stand wear and tear and cleaning.

The Committee of Medical Inspection of Schools of the American Medical Association made the following comments after an investigation on the school buildings in this country, June, 1911:

"Many schools are unfit for use and should be torn down. One-fourth of the schools need to be reconstructed. Recent school buildings are much better, and yet any number of faulty constructions are still going on. What is needed is a more vigorous educational campaign in what hygiene, sanitation, and efficient living require. What is still more needed is:

"1. The endorsement of certain standards and requirements in the planning and maintenance of school buildings and grounds by State and national educational and medical organizations.

"2. The enactment of legislation which will define these standards and insure the erection and modification of school buildings in accordance therewith."

The "Ten Commandments of School-house Construction"

by William E. Chancellor, of Norwalk, Connecticut, are well worth quoting:

"1. Whenever possible, the school building should have sufficient ground and be so oriented on its plot that into every school-room the sunlight will come directly at least one hour each day.

"2. Every school-house, whether in city or country, when over one story should be strictly fireproof.

"3. Every school-house should have at least two outer doors, for entrance and exit, with doors opening outward, and one outer door for every two rooms above four ground-floor rooms; and at least two stairways with an additional stairway for every two rooms above four upper-story rooms, stairways not over five feet nor less than four and one-half feet wide. In other words, the fire-proof building should be also as nearly panic-proof as human ingenuity and material resources permit.

"4. In every school-house the halls should be well-lighted from end to end.

"5. The toilet conveniences, when possible to avoid it, should not be placed in basements; either isolated towers or separate buildings should be used.

"6. Every child is entitled to at least twenty square feet of floor space in each class-room attended, and to at least three hundred cubic feet of air space; to a complete change of air every eight minutes, and to playground space at least equal to class-room space. With artificial heating and ventilating systems the problem is extremely difficult. Fresh air taken into the heating chamber should be taken from a height of ten to twelve feet above ground. All air ducts should be kept free from dust. The heated air should contain the proper amount of moisture. The air ducts conveying the foul air from class-rooms should be of sufficient size and construction that the change of air is possible.

"7. Unilateral or quadrant lighting has come to stay as the standard. With it has come the standard of not less than twenty nor more than twenty-five square feet of floor space as the lighting area. The arrangement of this lighting is a technical problem not well met thus far.

"8. Each class-room should have its own separate wardrobe.

"9. Each class-room should have two or three sets of lockers for books so that day and evening pupils or morning, afternoon, and evening pupils may use desks without interference with one another's property and without the resultant contamination and disease infection.

"10. Hitherto the notion has been to fit the school pupils into desks and chairs for book study. The new idea is to give to them space and opportunity for activity and development. It follows that the school, instead of being the mold for the pupils to fit, must itself be molded by the course of study. The old unit idea of fifty children to a room, and as many rooms of a standard size as there are classes of fifty children each, is giving way to the idea of the universal school with such rooms as these—viz.: (*a*) assembly and music halls; (*b*) physical training drill-rooms or gymnasiums; (*c*) drawing rooms; (*d*) offices and rooms for principal, head teachers, janitor, etc.; (*e*) science and art museums; (*f*) libraries and reading-rooms; (*g*) work-rooms for manual training, trades, handcrafts and domestic science and art. In every instance in which desks are used in class-rooms, the desk should be adjusted to the child and not the child to the desk."

The total value of the public school houses in the United States is about nine hundred million dollars, and according to William E. Chancellor, one-half of them are so abominable that they should be razed to the ground. There are some

ideal school houses, such as the Charlestown High School in Boston; the Wyman School, St. Louis; the Bernard Moos School, Chicago; Rosedale School, Cleveland, and the Morris High School, New York.

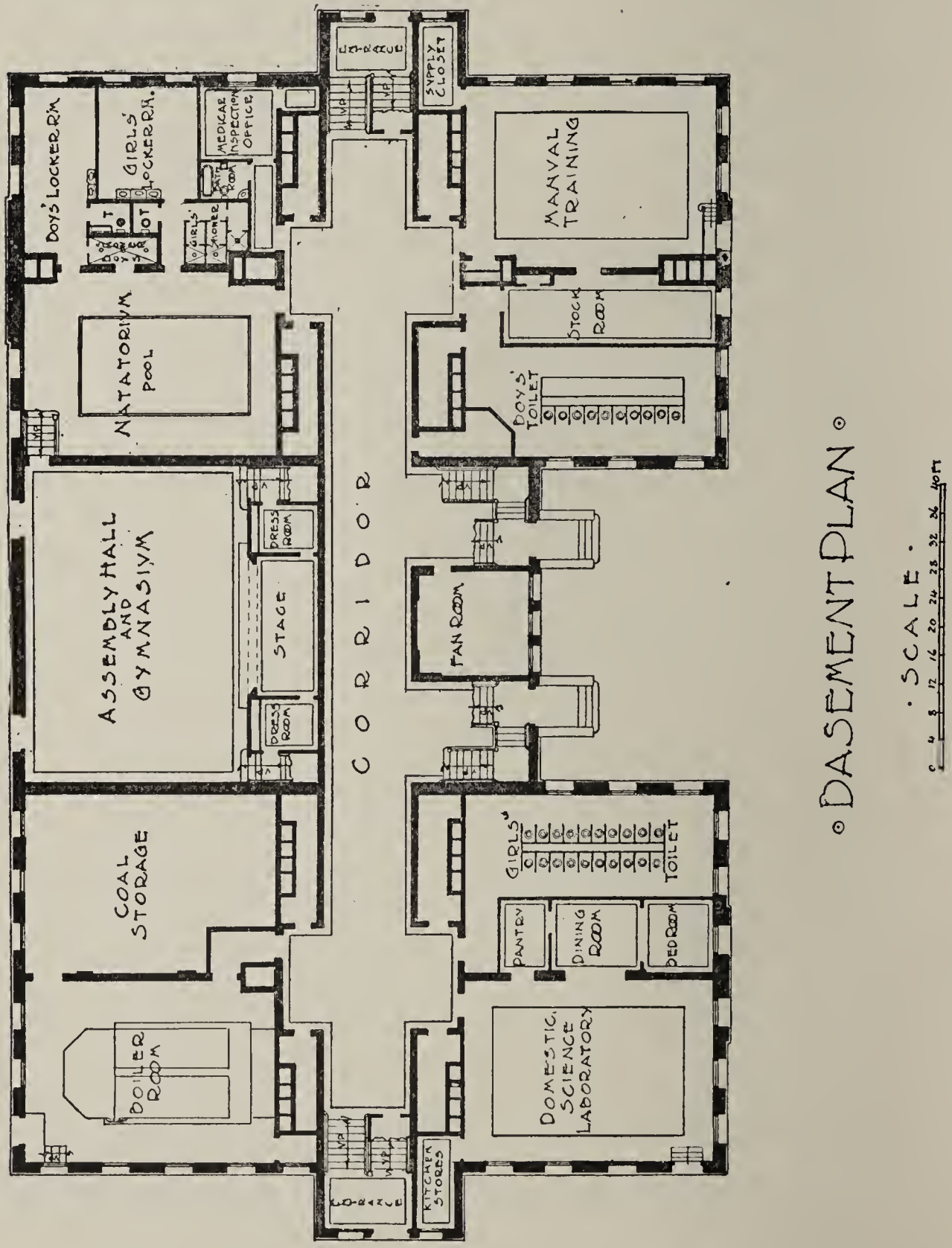


FIG. 6

The medical inspector may profit by studying the construction, and sanitation of some of these school buldings, which have ideal conditions. The accompanying diagrams are descriptive of a school in Toledo.

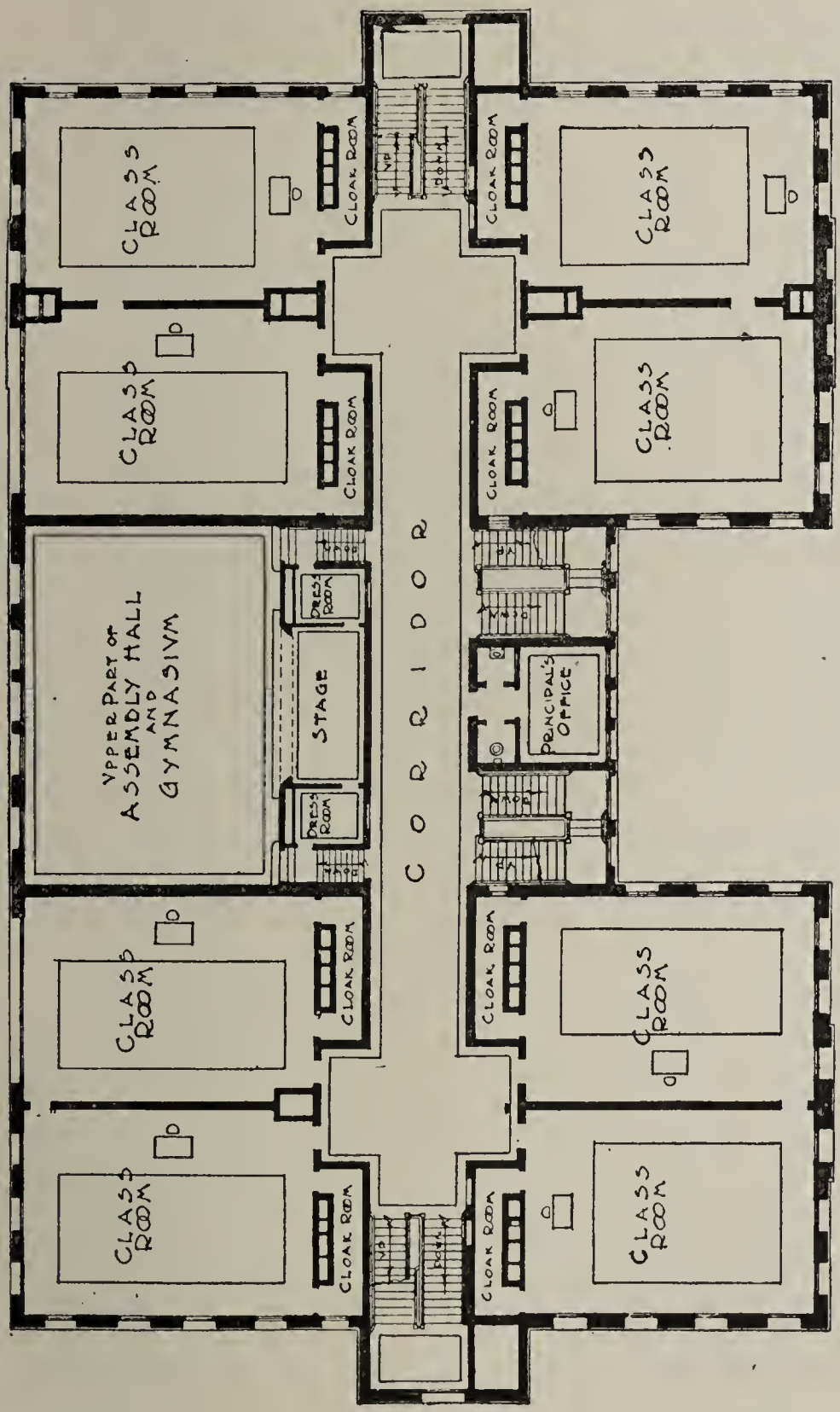


FIG. 7

FIRST FLOOR PLAN.
SECOND FLOOR SIMILAR.

Laws on Building Requirements.—It is advisable for State legislatures to enact laws which shall specify what shall be the requirements under which new school buildings may be erected within its territory. A number of States have some provisions for such operations.

The Pennsylvania school law has the following specifications in relation to school buildings:

Section 618. All school buildings hereafter built or rebuilt shall comply with the following conditions.

In every school-room the total light area must equal at least 20 per cent. of the floor space, and the light shall not be admitted thereto from the front of seated pupils.

Section 619. No board of school directors in this Commonwealth shall use a common heating stove for the purpose of heating any school-room, unless such stove is in part enclosed within a shield or jacket made of galvanized iron, or other suitable material, and of sufficient height and so placed as to protect all pupils while seated at their desks from direct rays of heat.

Section 620. No school-room or recitation-room shall be used in any public school which is not provided with ample means of ventilation and whose windows, when they are the only means of ventilation, shall not admit of ready adjustment both at the top and bottom, and which does not have some device to protect pupils from currents of cold air. Every school-room or recitation-room shall be furnished with a thermometer.

Section 621. Every school building hereafter erected or reconstructed, whose cost shall exceed four thousand dollars ($4000), or which is more than one story high, shall be so heated and ventilated that each room and recitation-room shall be supplied with fresh air at the rate of not less than thirty cubic feet per minute for each pupil, and

which air may be heated to an average temperature of seventy degrees Fahrenheit during zero weather.

Section 622. All school buildings, two or more stories high, hereafter erected or leased in any school district of the first class in this Commonwealth shall be of the second, third, or fourth class, every building more than two stories high, thereafter built or leased for school purposes, shall be of fireproof construction.

Section 623. All doors of entrance into any building more than one story high, used for a public school building in this Commonwealth, shall be made to open outward, and the board of school directors of every district in this Commonwealth shall, before the opening of the school term next following the approval of this act, change the entrance doors of every such school building so that they shall all open outward.

Section 624. In all school buildings more than one story high hereafter erected, all entrance doors as well as all doors from class-rooms, school-rooms, cloak-rooms or other rooms into halls shall open outward.

Section 625. Every school building shall be provided with necessary fire-escapes and safety appliances as required by law.

Section 626. The board of school directors in each school district shall put the grounds about every school building in a neat, proper, and sanitary condition, and so maintain the same; shall provide and maintain a proper number of shade trees.

Site.—The site for erecting a school building requires more consideration in rural than urban districts. In rural districts the ground should be free from dampness, and if located on a hill the southerly side should be preferred, as it affords more sunlight and protection against winds from

the north. Locations in level country should preferably have the corners of the building pointing north and south,

FIG. 8

School playground.

thereby affording sunlight for all sides at some part of the day. In cities the location should depend upon the school

School playground.

population of the neighborhood, and the school so placed as to be in the centre of the district. The available space should admit of ample playgrounds and be free from obstructions from adjoining high buildings. One of the most important features should be air and sunlight, which is dependent upon the plan of construction and the surroundings. Good results are generally possible with V. U. T. H. E. L. or Y. shaped buildings.

Playgrounds.—Playgrounds serve the double purpose of allowing space around a school for light and air, and furnishing the necessary means for the children to obtain exercise and pleasure out of doors. Every State should have a law forbidding the building of a school-house without suitable playgrounds. This may seem an unnecessary provision, as it seems scarcely plausible that a city would allow such an absurd thing as a school without a playground—yet it may occur. The size of the ground should be minimized by law. In Massachusetts it is limited to two acres; in England by rule of board, and in Germany there is required thirty square feet for every child using the school.

Playgrounds should be suitably equipped for play and exercise for the children. They should be paved with brick, asphalt, or some material that can be readily cleaned. If space is sufficient, part may be used for experimental gardening and part for sand-piles, etc.

Safety against Fire.—It is not generally known, but at least one hundred school-houses burn down every year. Therefore, every precaution should be taken to guard the safety of the pupils by sufficient doors in each class-room opening out into halls and on fire-escapes. Fire-proof buildings are desirable. As panic is more dangerous than the immediate effects of fire, frequent fire drills should be held to give confidence and discipline.

Fire-escapes should preferably be located in a tower separated from the building. Smoke and flames shooting through windows around iron escapes fastened to the walls make them of little value. Interesting experiments have recently been made with chutes instead of steps for escape.

Schools should be free from accumulations of refuse and inflammable material. Galvanized cans or a special fireproof pit should be provided to hold ashes immediately after removal from the furnace. Ashes should be removed from the building at frequent intervals.

It is a duty of the inspector to see that fire extinguishers are of an approved make, in working order, and placed where they can be seen and readily gotten at. All extinguishers should be recharged every few months and the date of such action marked on a tag attached to the extinguisher. Teachers and older pupils should receive instructions in the use of fire apparatus. In cities, members of the fire department should make regular systematic inspections of all schools, and recommend changes where needed.

Plumbing and Drainage.—An ordinary school building is supplied with water-closets, urinals, sinks, washstands, drinking fountains, and boiler, making the plumbing at times intricate. The water-supply for closets and urinals may be taken from a reservoir or tank in or on the building. The street mains are usually constructed of cast iron with leaded joints, lead or wrought-iron service pipes bring the water-supply through the building, and lead pipes are attached to the various fixtures. All pipes should be located and protected when in exposed positions to prevent freezing in cold weather.

The arrangement of pipes and appliances for drainage, or the removal of waste water and sewage, requires care and

ingenuity, as faulty plumbing may be a menace to life. A complete barrier should be interposed against air currents working back through the pipes into the building. Traps and depressions containing a head of water are used for this purpose. Each fixture in the building should be properly trapped. Soil and vent pipes should receive special attention.

Toilets and Urinals.—The inspector should in his investigation of sanitation of building and grounds carefully inspect all water-closets and urinals; noting the location, condition of flush and ventilation, the number in relation to the school population, and the cleanliness of the room and basins. All traps and waste pipes should be effective to prevent odors. Where trough water-closets are used cleanliness and frequency of flushing should be noted. Out-houses should not be located too near class-rooms. There should be separate closets in each playground for both sexes and properly screened. Urinals should be constructed of slate or stone, properly flushed by constant running water. The slope should be sufficient to insure against stagnant pools. Soil pipes should be large to prevent being easily clogged up.

Toilets and urinals in the building should be sufficient to meet the demands of the school population. They can be located in basement or on each floor, in which case they are best located in towers isolated from the class-rooms. Drainage, plumbing, and ventilation must be carefully considered. Seats should be supplied suited for the younger children.

Water-supply.—In order to determine the purity and suitability of water for household or drinking use, both chemical and bacteriological examinations are necessary. Chemical analysis shows the presence of organic and mineral impurity, such as accompanies infectious excreta from the intestines or bladder, also the presence of sewage. A bacteriological

analysis shows the presence of bacteria, pathogenic or non-pathogenic. A chemical examination would show when a water is dangerous and liable to contamination from germs, and is an available safeguard even before bacteriological examinations show the presence of infection.

In country or suburban districts, one must not be deceived by the clearness of the water, especially where the supply is from a well or spring, as there is always the possibility of infection from nearby or even distant sewage.

Drinking Fountains and Cups.—In most of the large cities either by legislation or common sense, the public drinking bucket, cup, or spigot has been abolished. It has been proved to be a source of grave danger, spreading contagion that can be readily avoided. In the United States investigation shows that 25 per cent. of the cities have individual drinking cups and in 75 per cent. of their schools are sanitary drinking fountains. The following States have legislation forbidding the use of public drinking cups in school-houses: New Jersey, Wisconsin, Michigan, Kansas, Mississippi, Oklahoma, Massachusetts, Iowa, California, and Pennsylvania. There are also innumerable cities that through their Boards of Health have forbidden the use of these cups.

The following is a statute in the State of Massachusetts:

AN ACT

To Restrict the Use of Common Drinking Cups.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same as follows:

Section 1. In order to prevent the spread of communicable diseases, the State Board of Health is hereby authorized

to prohibit in such public places, vehicles, or buildings as it may designate the providing of a common drinking cup, and the board may establish rules and regulations for this purpose.

Section 2. Whoever violates the provisions of this act, or any rule or regulation of the State Board of Health made under authority hereof, shall be deemed guilty of a misdemeanor and be liable to a fine not exceeding twenty-five dollars for each offence.

Section 3. All acts and parts of acts inconsistent herewith are hereby repealed.

Section 4. This act shall take effect on the first day of October, nineteen hundred and ten.

HOUSE OF REPRESENTATIVES, April 7, 1910.

Passed to be engrossed.

Sent up for concurrence.

JAMES W. KIMBALL, Clerk.

Where children must drink from the ordinary spigot without the aid of a cup, and the school authorities cannot be induced to install a sanitary drinking fountain, the safer plan is to turn the outlets up so the water is forced up and flows down over the opening. However, there is a very cheap sanitary arrangement that can be attached which replaces the old faucets. This arrangement, shown in the illustration, has been successfully tried out in Toledo's schools. It consists of a small glass cup with automatic cut off from which the child can drink without his lips touching the glass. Many different makes are marketed at various prices, but all are designed on the same principles.

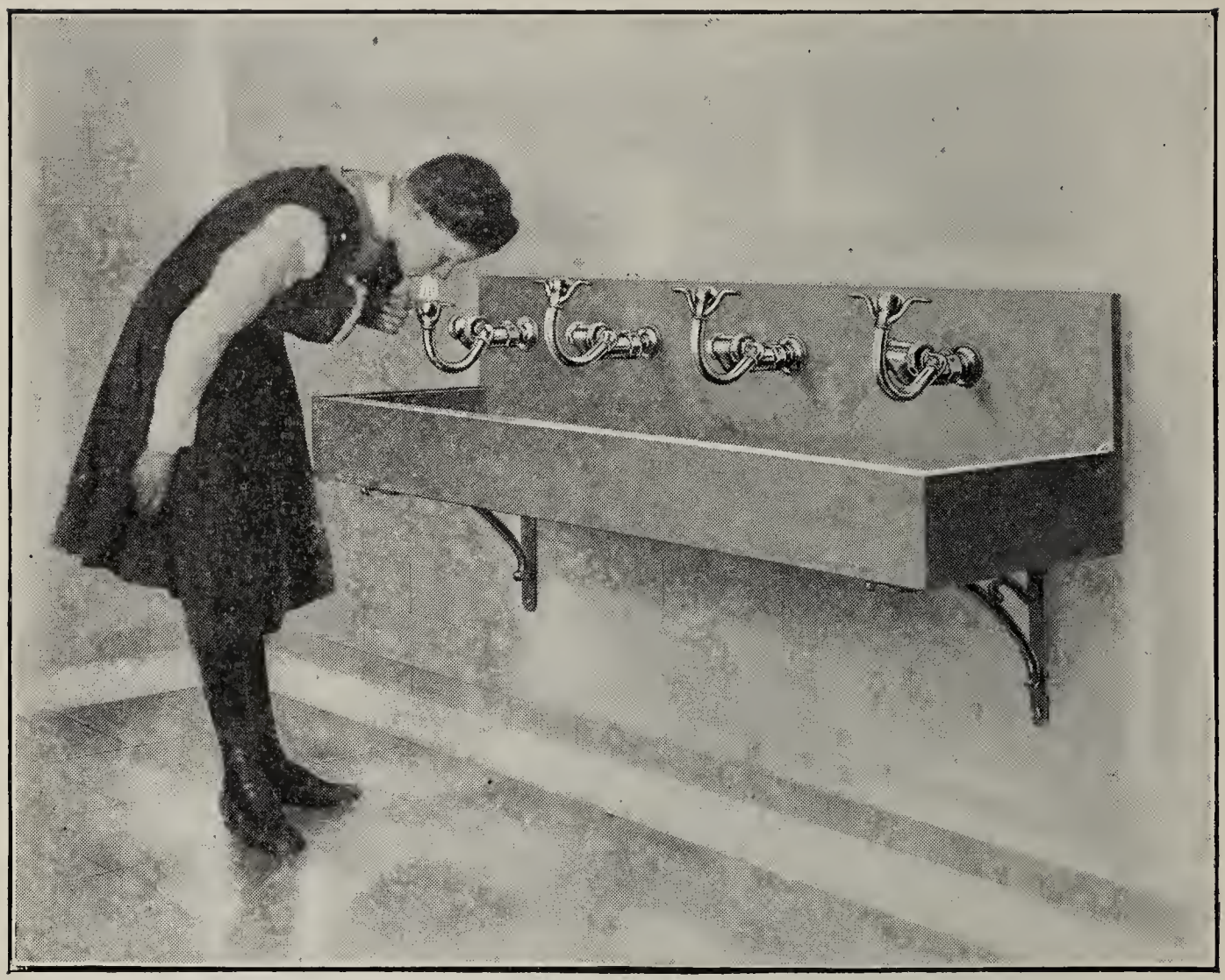
Since the abolishing of the public drinking fountains and cups in several States and many cities, there have been placed on the market numerous inexpensive paper cups made of a

FIG. 10

Type of sanitary drinking fountain installed in schools by placing bubbling-cups on old fixtures.

heavy bond or paraffined paper. Illustrations are here shown of some of these individual cups, also a simple method of making a cup from a square piece of paper. The pupils

FIG. 11



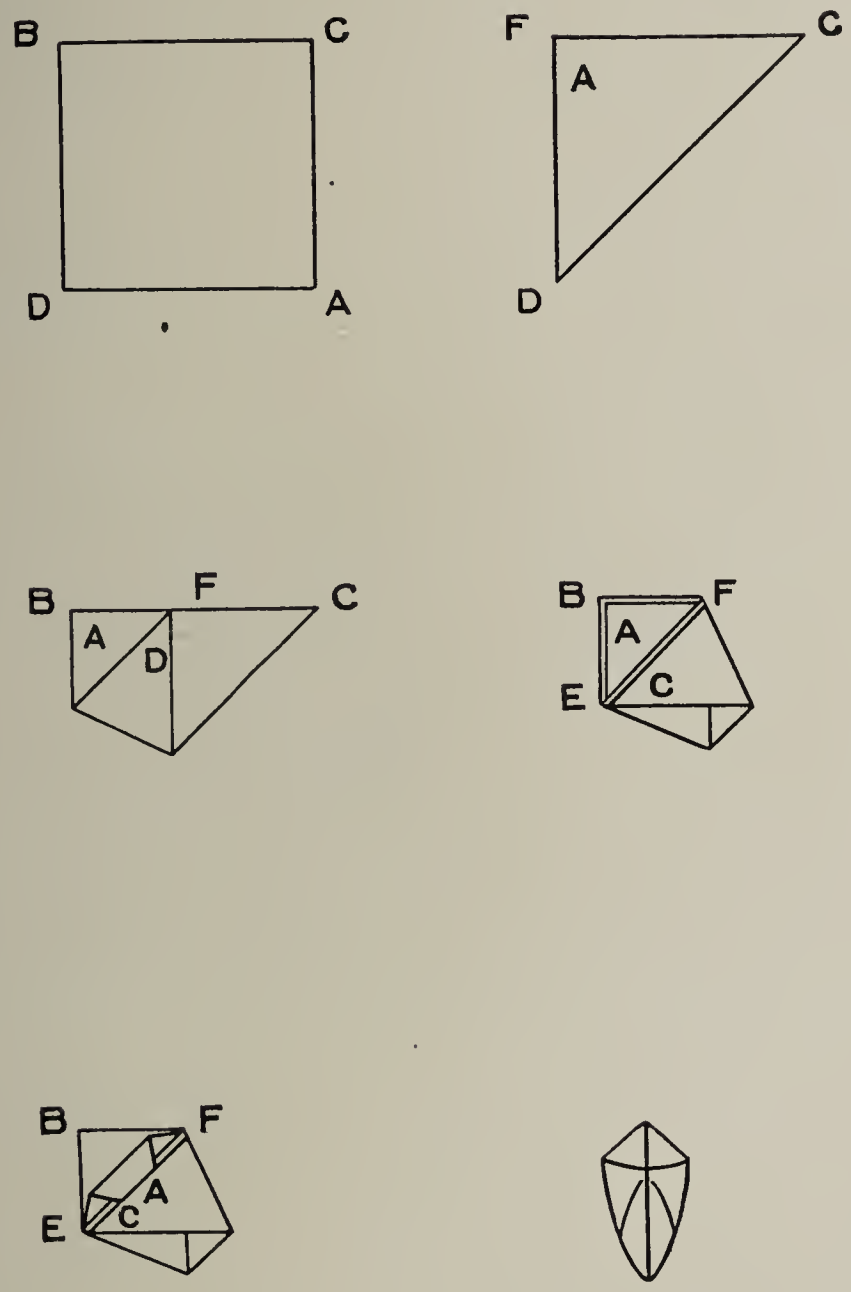
A Springfield drinking fountain.

FIG. 12

Paper cups.

can readily be taught how to make such cups and encouraged to use them on all occasions.

Fig. 13



Individual cups made from squares of paper; easily taught to the children.

Class-rooms.—Class-rooms should be large and cheerful and should seat not more than forty-five pupils to a room. The air space should be such as to allow not less than two hundred, and if possible three hundred, cubic feet per child.

Children are compelled to live five hours every day in these rooms, and it should not only be made inviting, but serve as an object lesson for healthful home living. Faulty lighting, ventilating or seating may directly cause many of the defects found among school children, and the school physician must be sure that school conditions are not responsible for the defects diagnosticated.

Lighting.—Class-rooms in most buildings are lighted from three of the four points of the compass. The side not desired is the one giving no sunlight in winter. The east and west rooms are more desirable when it is only possible to use two sides. The amount of window area should be about one-fifth of floor space. Windows should not extend too near the floors, as the very low part is of little practical value.

Artificial light is necessary in most class-rooms on dark days. Much has been written about various forms of artificial lighting, but experiments in Chicago and Boston prove that direct lighting with ground-glass bulbs and reflectors situated high enough to diffuse the light is better than indirect lighting. There are, however, class-rooms in which mechanical work is taught where reflected light may be an advantage. Windows should be furnished with a light colored shade, which not only controls the direct rays of the sun, but by diffusing them aids in the lighting. The color of the wood-work and walls should be in light tints and the desks and other furnishings should be in harmony. A few appropriate pictures add cheerfulness and a finishing touch in the way of decoration.

Dr. Myles Standish, of Harvard University, offers the following specifications for artificial lighting of school-rooms.

1. The walls should be painted a very light color, preferably an exceedingly pale green or buff.

2. The wooden finish of room and desks should be light in color.

3. The window shades should be able to exclude direct rays of sun, diffuse daylight freely, and also reflect a generous proportion of the light which falls upon them in the evening.

4. Direct illumination is desirable.

5. The lighting stations should be so arranged that no annoying shadows fall on the pupil's desk.

6. The newer forms of incandescent lamps and Zalinsky shades, when properly arranged, will give a candle foot illumination of 2.5 on each desk in the ordinary school-room.

7. In most cities the expense of electricity used in the manner above described is not so much greater than the cost of gas.

Lockers and Closets.—Where lockers and closets cannot be located in basement, arrangements can be made to place them alongside of class-rooms, with entrance from halls as well as rooms. A sufficient number of hooks should be provided to allow a separate hanger for each pupil. Where possible it is preferable to have separate lockers for each pupil.

Cleanliness.—Cleanliness of school buildings from the viewpoint of the school inspector includes the absence of refuse, the dusting of rooms and furniture, and the cleaning of floors and playgrounds. Janitors, who depend upon political favor for their appointment are often very negligent in performing their duties. To inquire whether these caretakers use damp cloths for dusting, a vacuum cleaner, or a dust absorbing compound is of little importance. The question to solve is how often they use these implements and with what efficiency. An investigation of 1038 cities by the Child Hygiene Department of the Russell Sage Foundation showed that 643 claimed to use damp cloths for dusting, 894 dust absorbing compounds, and 87 cities

employ vacuum cleaners. However, the floors were washed and swept and windows cleaned at varying intervals. The most common practice seems to be once a month, often once in three or five months, and in some cities once a year.

Inspection for cleanliness should not be confined to annual or biennial visits, but should be done frequently and always at a time unexpected by janitors. Observe conditions of cellars, toilets, and playgrounds. In recording presence of dust, due allowance should be made for old dilapidated buildings where floors and walls create excessive dust from wear.

Dust is harmful because it acts as an irritant to the mucous membrane, and assists in spreading infection. Every means should be employed to prevent its accumulation, and dissipation through the air. Dust may be lessened in schools by proper sanitary methods of cleaning, requiring pupils to wipe their feet before entering building, and using moist erasers for blackboards. Old floors can be oiled with advantage.

School Furniture.—The relation of school furniture, desks and seats, to spinal curvature is briefly told in the chapter on "Orthopedic Defects." It emphasizes the great need for desks and seats built on scientific principles and the proper seating of school children. Dr. James Warren Sever, of Boston, has studied this important problem in the schools of the United States. He addressed inquiries to 230 school departments in cities with 250,000 population and over. Tabulated answers from 38 per cent. of these cities showed the following points of interest.

1. The almost total uniformity of cities toward installation of adjustable furniture.

2. The large number of cities in which only a small percentage of the total equipment is adjustable.

3. The use of the single desk and chair in place of the older form of double desks with settees and benches.

4. The uniformity of the two types of adjustable furniture, namely, (A) The separate chair and desk (B) The automatic with settee seat.

The inadequacy of the first type of chair back (No. 4 [A]) and the faulty design of (No. 4 [B]) cause bad attitudes

FIG. 14

Showing unnecessary support above the hollow of the back; contributes to slouching.

FIG. 15

Showing chair and desk too small for a large child, which condition allows nothing but a bad posture.

and must be uncomfortable. The seats slope too deeply backward, the backs vary considerably, and give support in the wrong place. The accompanying illustrations show the varieties of furniture most frequently used in the schools of the United States, and point out the good and bad features of each.

While most of the large cities have installed some modern furniture, most of the rural districts still use benches that

have the back and seat fastened to the desk behind, and in many places children are seated in ordinary kitchen chairs, or benches with no support for the back.

FIG. 16

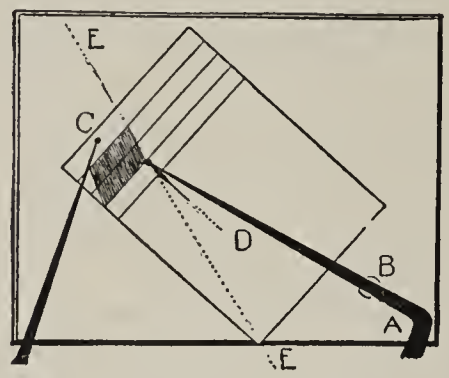
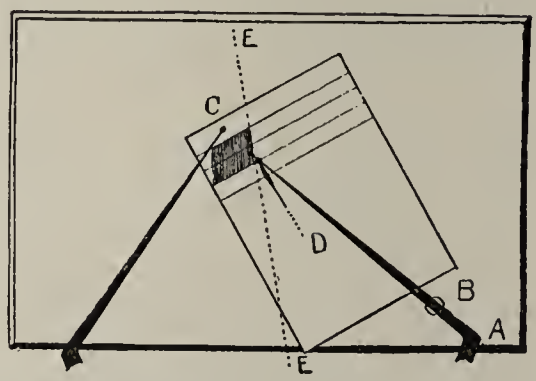


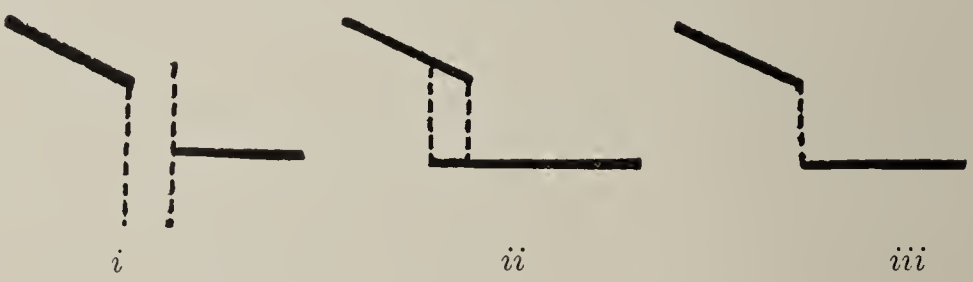
FIG. 17



These diagrams are intended to show clearly the position of the writing paper on the desk, the relative positions of arms, paper, and desk, and the direction in which the pen moves to secure uniform slant. Fig. 16 is the half side position mostly used in public schools and best adapted to them, because of the character of the desks. Fig. 17 is the square front position. In both diagrams, *A* represents the square turn at the right elbow and its position on the desk, *B* is the muscular rest of the forearm, *C* the position of the left hand in its relation to the paper and the right hand, *D* the pen-holder, and *E E* the imaginary line between the eyes along which the pen should travel in upward and downward strokes.

With the right forearm crossing the lower edge of the paper a little to the right of the centre, the pen should progress one-fourth or one-third of the distance across a sheet of paper eight inches wide, before the position of the paper is changed. Always use the left hand to move the paper. Paper of this width should be shifted two or three times, and when the end of the line has been reached, the paper should be returned to its original position. Lift the pen before moving the paper.

FIG. 18



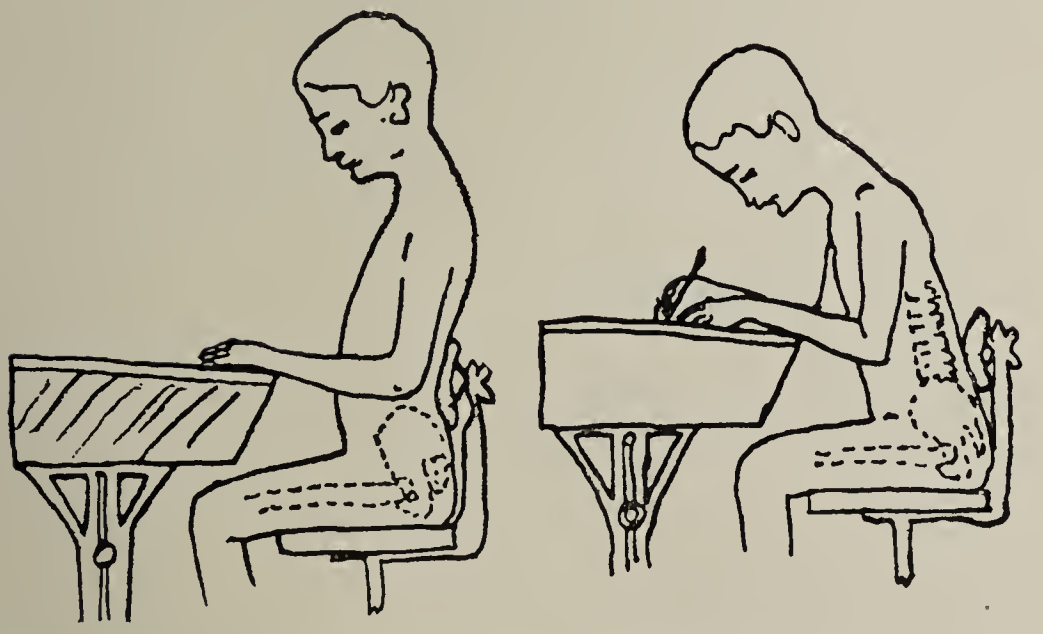
Showing arrangement of seat to desk; *i*, plus distance; *ii*, minus distance; *iii*, zero distance.

There are on the market about 200 models of desks and chairs, most of which are poorly constructed, that give

FIG. 19

Chandler adjustable desk with the Boston chair.

FIG. 20

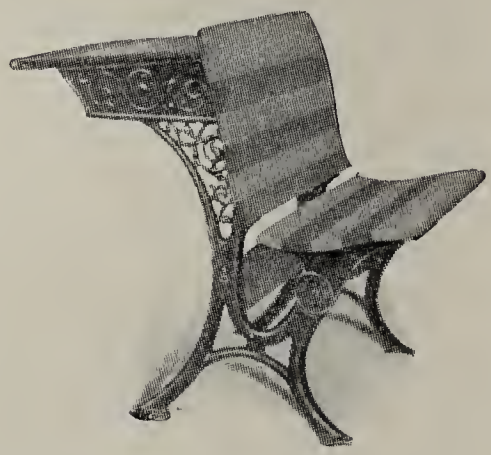


Boston school-house commission desk and chair, devised by Dr. F. J. Cotton. Good types of school desk and chair, also showing position of child in the chair.

either a faulty support to the back or none at all. The child is adjusted to the furniture and not the furniture to the child. In most of the seats it is impossible for a child to

FIG. 21

FIG. 22



Faulty desks and chairs, stationary and non-adjustable.

FIG. 23

Adjustable desk and chair of steel; good type, but back of chair could be improved.

assume a comfortable and correct posture. Desks and chairs cannot be chosen for children according to grade in school or age of child. The height of the child must be the only consideration. This requires adjustable furniture. The desk and chair must not be too high or too low, nor too near or too far from each other.

FIG. 24

Adjustable Chandler desk and chair; good type, but back of chair could be improved.

School desks must be adjustable to height, and there should be sufficient room below for the knees. It should be low enough for the elbow and forearm to rest comfortably on the desk without bending the back. The feet should rest flat on the floor and not dangle or be forced above the seat. The top should slope at an angle of ten to fifteen degrees, which will be comfortable and yet not allow the papers to slide off.

The seat should be no wider than the hips, in depth two-thirds the length of the thigh, and should slope only slightly backward. The front edge of the seat should be about

one inch behind the front edge of the desk. The construction of the back of the chair is very important and should slope very slightly backward and support the spine in the lumbar region in all positions of the child. Any support above the hollow of the back is unnecessary, and tempts

FIG. 25

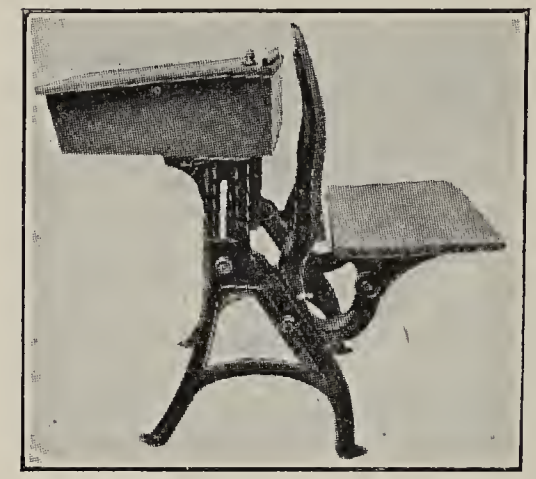


FIG. 26

FIG. 27

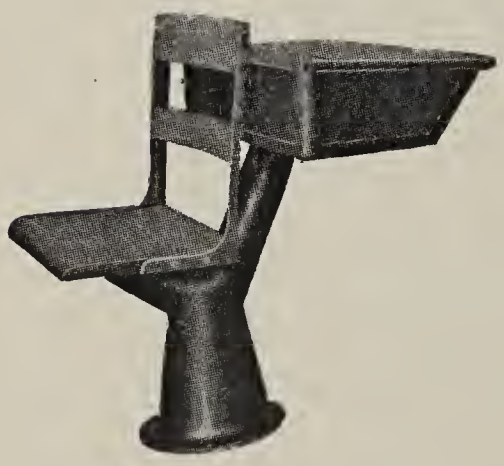
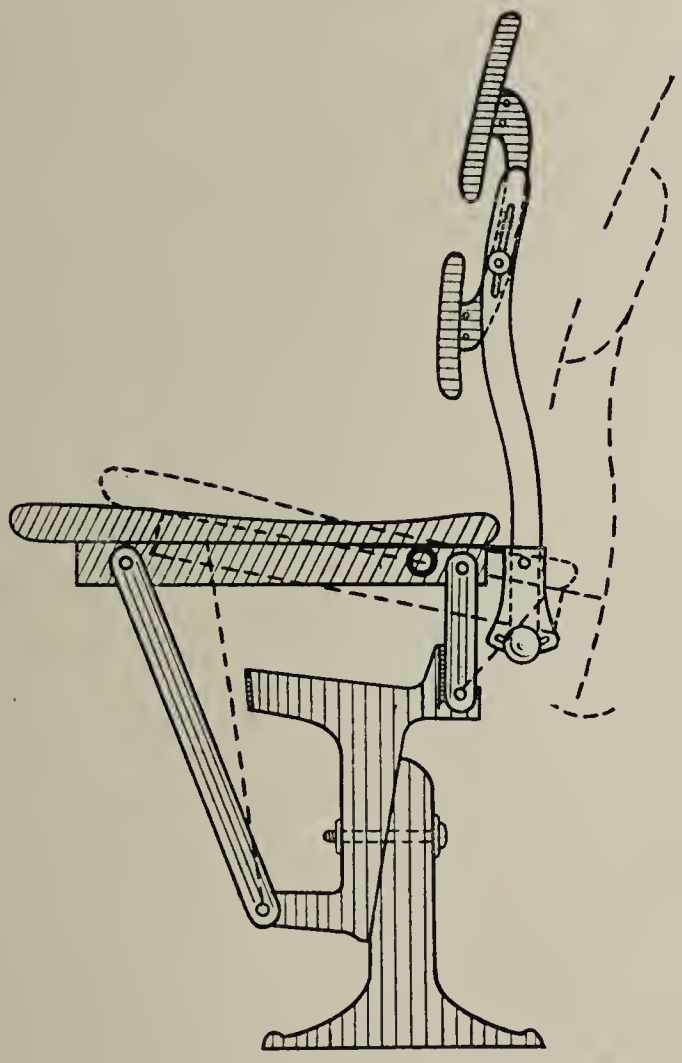


FIG. 28

FIG. 29

FIGS. 25 to 29. Some types of adjustable desks and chairs with various defects.

FIG. 30



Adjustable school seat. (Miller and Stone.)

slouching positions. Desks and chairs adjustable in all directions are complicated, require considerable care, and have no special advantages. The chair may have one or two cross-bars, providing they are not higher than the lower part of the shoulder-blades. An adjustable cross-bar is an advantage, and should be convex forward and concave from side to side to fit the lumbar curve.

Single desks and chairs should be preferred. Benches, kitchen chairs, and settees are distinctly bad.

At the beginning of each school term the medical inspector should make a careful inspection of the furniture as adjusted to each child in the school he visits. He should also urge frequent rest periods to protect the children against fatigue. Most cities have some arrangement for physical exercise for the pupils, which is a most valuable adjunct in the prevention of spinal deformities.

Ventilation and Heating.—Pure air in the class-rooms has an important bearing on the health and vitality of the pupils who are required to spend several hours daily indoors. By pure air is meant air having the required component parts of oxygen, nitrogen, argon, carbonic acid, and aqueous vapor. The carbonic acid, which is conceded to be one of the most variable factors and the deleterious product, should not exceed 0.04 per cent. in the volumetric composition. In schools as in other dwellings, various foreign particles, including some that may be infectious, are carried in the air.

The air may become vitiated by the respiration of the children and teacher, by combustion of coal and gas, by fermentation and putrefaction of animal or vegetable organic matter, by dried excreta and dust from chalk, blackboards, slates, wear of floors, and furniture.

The average individual breathes at the rate of seventeen respirations per minute. At each respiration 500 c.c.

(30.5 cubic inches) of air pass in and out of the lungs. In its passage through the lungs the air loses 4 to 5 per cent. of its oxygen, and when exhaled this volume in carbonic acid is added. The amount of aqueous vapor is increased, the temperature is elevated to that of the blood, 98.2° F., and there is added considerable putrefiable organic matters. The kind and quantities of these organic matters vary with individuals, their cleanliness and state of health. Germs of communicable diseases located in the respiratory tract of a child are added to the exhaled matter. These germs and dust particles inhaled in respiration adhere to the moist mucous membranes of the nose, throat, and mouth, and some may later reach the lungs, if not again exhaled or removed by the secretions of these organs. The purity of the air depends upon the efficiency of the installation which controls the entrance of fresh air and exit of the foul or vitiated air. The process of this circulation of air is known as ventilation.

Ventilation may be (1) natural or (2) artificial. One should also consider an "internal" ventilation referring to the ventilating of the buildings and "external" or the diffusion of the atmosphere around the building. The latter is rarely taken into consideration, but of primary importance. The width of the streets, and the distance between buildings as well as the height of neighboring structures influence the atmosphere outside. Drainage, sewerage, refuse, and decaying animal or vegetable matter may vitiate the surrounding air as well as that of the building. This is so in ventilation where the air is forced from the outside through the building.

Direct or natural ventilation is due to (1) the action of winds, and (2) diffusion of gases of unequal densities and temperature. Buildings receive the effect of these forces

through open windows, doors, and chimneys, and through porous structures or loose fittings.

In the artificial methods, air is forced through a building by means of fans. This air may be heated over hot-water pipes or by steam. The impure air is removed from the building by extraction. The column of air in the outlet or extraction shaft is set in motion by various systems of heating the air, and can be increased by creating a vacuum in the upper part of the flue by the use of ventilating cowls. Care must be taken that the process of heating the air does not produce a dry, hot air by lowering the humidity. This can be avoided by humidifying the air with live steam before it reaches the rooms.

Ventilation has always been a vexing problem that has produced many ideas and plans, some simple, some intricate, but practically all are imperfect from one cause or another in practice. Some prefer the plenum system, others a gravity system, but whatever the system it is to some extent dependent upon the janitor for regulation, and therefore requires some intelligence and skill and most important, common-sense. It must also be borne in mind that the thermometer is not the only gauge to ventilation and heating, as humidity plays an equally important function. These are phases which at present are being investigated, and not as yet thoroughly understood. It remains, however, to be said, with our present knowledge of ventilation, nothing can surpass the direct ventilation from open windows. There should be a complete change of air every eight minutes. A class-room for forty-two pupils should be twenty by thirty feet, with a ceiling height of at least twelve feet, and in buildings with little open space around them, a fifteen-foot ceiling is more desirable.

Heating, closely allied to ventilation, is a serious problem

in the schools. The ancient coal stove cooked the child nearest to it on one side and froze him on the other, while the other pupils experienced varying degrees of discomfort. Direct hot air from furnaces was almost as unsanitary. More modern heating plants which take fresh air from the outside and force the heated air through radiators, automatically controlled, are more desirable.

There is little doubt that not only the temperature of the room but the amount of vapor or humidity affects the grade of scholarship. Every class-room should be equipped with a thermostat and a thermometer, which should be critically observed by the medical inspector at frequent intervals The inspector should never take the opinion of a teacher as to the effectiveness of the ventilation and heating, for the reason that people working in a room become accustomed to odors and unconscious of ill-ventilation. In his records, the physician should calculate the amount of cubic space allowed each child in a class-room, and each room should be estimated separately, noting the size and efficiency of inlets and outlets to the system. The inlet can be told from outlet by watching the direction of a candle flame held before the opening. There exist instruments (anemometers) for the purpose of measuring the velocity of ingress or exit of the air, which are valuable where a scientific study is being conducted.

The inlet should be located a few feet above the floor and should cause no unpleasant draughts or dust. Outlets should be as high as possible and close to the ceiling. The relation of inlets and outlets should be such as to cause the air passing from one to the other to mix with the atmosphere.

The temperature of class-rooms should not be allowed to go above 68° F. during days when the building is artificially heated. A temperature of about 65° F. is to be preferred, as the mind and body seem to work better at

this figure. Thermometers should be placed about four feet above the floor and not against walls or partitions that admit of radiation and false readings. When the pupils are at recess, windows should be opened wide.

The relative humidity of a school-room should be near 50 per cent., and should not be allowed to drop below 40. The complaint of teachers to window or wall sweating is erroneous, as it is an advantage in many cases. Rooms where no air currents exist, are sure to be hot and dry. These air currents are necessary both winter and summer.

Systems of mechanical ventilation depend on the use of blowers or exhaust fans; the former is known as the "plenum" system and the latter the "vacuum." In the plenum system the air is drawn into a box and by revolving fans blown through a conduit into the building. When desired, the air may be passed through a chamber to heat it before entering the rooms. The vacuum system is just the reverse of this and consists in drawing the air from the rooms through conduits by means of exhaust fans and discharging in the open. The plenum system is less expensive, as it does not draw away the heated air so quickly, and more practical because it avoids draughts.

Care must be taken, however, as to the source of air used, also the filtering.

The heating of a building may be by direct radiation, such as open fires or stoves; by conduction, as furnaces, and by convection, as exists in circulating steam or hot water passing through pipes and radiators. The method to be adopted depends largely upon the space to be heated, the smaller the space the simpler the method required. Hot water and steam pipes are more suitable for large buildings, and are of the "direct" or "indirect" method. The "direct" method has separate heating surfaces in each room; the

PLATE II

A Cold-room Class.

"indirect" concentrates the heating surface in a compartment in the basement and distributes to the various rooms through conduits.

COLD-ROOM AND OPEN-AIR SCHOOLS.

If we wish to prevent tuberculosis and malnutrition in children, plenty of pure fresh air and nourishing food are needed. The child who is tuberculous or is likely to become so by reason of a predisposition inherited or acquired, requires our special attention on the question of fresh air; but we should not wait for a child to reach this precarious condition. All children should receive the benefits of fresh, pure air while at school.

For the physically deficient child, there can be adopted (1) cold-room schools or (2) open-air schools.

1. Cold-room schools are adapted for cases of malnutrition, anemia, pale and physically undeveloped pupils, children with enlarged glands, not tuberculous, enlarged tonsils, and adenoids. These cold-room classes can be organized in any school building. The windows are kept wide open, the air diverted by screens, and the children wear the ordinary street wraps and gloves. The temperature is maintained between 50° and 60° F. Several periods of the session are devoted to some form of exercise which necessitates moving about the room, but no time is allowed for recess or lunch.

2. There are various types of open-air schools (Plates III and IV) to be found both in Europe and this country. In Germany there are the "Waldschulen," or forest schools, which are feasible during the summer months or in a temperate climate. Chicago has a similar institution in the "Outing Camp at Algonquin," which is somewhat like the vacation country homes.

The two common types of fresh air schools used in this country are the open-air class-rooms built on the roof of a school or other institution, and temporary structures with a roof, flooring, and sufficient sides to protect against wind and weather, built in the open.

There are fifty-five open-air classes in the United States accommodating 1755 pupils. The following cities have such institutions:

List of Open-air Schools in the United States.

City.	No. of schools and classes.	No. of pupils.
Monrovia, Cal.	1	
Oakland, Cal.	1	25
Colorado Springs, Colo.	(Not yet in operation)	
Denver, Colo.	(Not yet in operation)	
Hartford, Conn.	1	25
South Manchester, Conn.	1	20
Washington, D. C.	1	35
Chicago, Ill.	Tuberculosis Institute School (three or four extra schools during summer months)	
Chicago, Ill.	6	250[1]
New Orleans, La.	2	160
Boston, Mass.	5 class-rooms	100
Cambridge, Mass.	1	30
Grand Rapids, Mich.	2	40[1]
St. Paul, Minn.	(Not yet in operation)	
Montclair, N. J.	1	21
Newark, N. J.	1	30
Orange, N. J.	2	43
Albany, N. Y.	1	25
Buffalo, N. Y.	1	20
Schenectady, N. Y.	(Not yet in operation)	
New York City	12	526
Rochester, N. Y.	1	30
Syracuse, N. Y.	(Not yet in operation)	
Cincinnati, Ohio	2	40
Cincinnati, Ohio	1 open-air room	35
Columbus, Ohio	(2 schools projected)	
Hazleton, Pa.	1	40
Mt. Airy, Pa.	1	30
Philadelphia, Pa.	3	75[1]
Pittsburgh, Pa.	2	75
Williamsport, Pa.	(Not yet in operation)	
Pawtucket, R. I.	1	25
Providence, R. I.	1	25
Kenosha, Wis.	1	30

[1] Approximate.

PLATE III

An Open-air School in Boston.

There can be little doubt as to the value of these fresh-air classes. Any child whether inclined to tuberculosis or not will be benefited. These classes have a special curriculum which includes plenty of exercise and rest periods, and the children are furnished with lunches of nourishing food. To assure maximum and permanent results require a study of the home and social conditions of the pupils, and remedial measures to prevent the undoing of good accomplished at the open-air schools. While at school the children are protected against cold by wearing wraps, caps, and mits, and when needed, blankets are wrapped around the legs. Under such care, pupils rarely complain of any discomfort from low temperature.

LIBRARY
OF THE
UNIVERSITY OF CALIFORNIA

PLATE IV

Outdoor School on Roof of College Settlement in Philadelphia.

Food, nursing, and medical direction by the Phipps Institute. Teacher supplied by the Board of Education.

PART III.

INFECTIOUS, CONTAGIOUS, AND COMMUNICABLE DISEASES.

GENERAL CONSIDERATIONS.

Medical inspection was first introduced into the schools for the purpose of preventing the spread of infectious diseases, and even today in a number of cities the only duties of the physicians are to protect the pupils from contagion. Many cities are indebted for their school inspection to an epidemic of some infectious disease which played havoc in the schools. There are 1285 cities in the United States that have organized systems of graded public schools under superintendents; 443 have systems of medical inspection, while 405 of this number inspect for the detection of contagious diseases. Only 214 of the cities claim to make complete physical examinations through school physicians.

The contagious diseases found among school children are the major infectious diseases or exanthemas and the minor contagious skin and eye diseases. The infectious diseases, like scarlet fever, diphtheria, measles, and smallpox, are of first importance to the medical inspector, because they are extremely dangerous and often fatal. The contagious skin diseases may cause an epidemic and inconvenience those afflicted, but are not detrimental to life. The duty

of the school physician is to diagnosticate all cases and exclude those which are dangerous in the class-room.

Either by statute, or by rules and regulations of health or educational departments, the school doctors are forbidden to treat any defect or disease among the pupils of the schools under their charge. In this study of diseases and defects, treatment is therefore omitted, except prophylactic treatment, insofar as it concerns the work of the medical inspector. The medical work of the school physician deals primarily with diagnosis; therefore, more consideration is given to this subject. The success of the inspectors in preventing the spread of contagion is largely dependent upon accuracy in diagnosis; therefore, health departments should place at the disposal of their school physicians every opportunity for a thorough training in the recognition of the common contagious diseases at a contagious disease hospital. The physician does not have the advantage he would in private practice in that all cases of a suspicious nature found in a school must be diagnosticated at once, as delay is dangerous. At a home, if the attending physician is in doubt, he may isolate the child for a day or so and watch developments before giving a final diagnosis. In school the physician is not allowed this privilege. Therefore, it behooves the physician who contemplates school-work to become expert in physical diagnosis. Even then a well-trained physician will meet with occasions when the signs and symptoms are so atypical or masked, that a diagnosis is impossible and the services of an expert are required.

It is well for a city to have in connection with the corps of medical inspectors one or more diagnosticians, physicians expert in the diagnosis of contagious diseases, to whom all cases of doubtful diagnosis can be referred. Philadelphia has four diagnosticians.

PLATE V

An Open-air School under the Direction of the Phipps Institute, Philadelphia.

Located on the roof of the institution.

Certain rules should be observed in the finding of contagious diseases among school children for the purpose of safeguarding the other pupils as well as the community. As this subject is important some space in the succeeding pages is employed to indicate what action the inspector should take when he finds a contagious disease at school.

Prevalence of Contagion among Children.—The so-called children's contagious diseases are not only more common among children than adults, but also more fatal. Scarlet fever, for instance, is eight times more fatal among children and 90 per cent. of the deaths from diphtheria occur under the age of ten years, thereby making the schools the greatest camping ground for contagious diseases. Besides the ordinary, typical, and easily recognizable cases there may be mild ones difficult to diagnosticate, including convalescents who have been released too soon; those who have criminally concealed their contagion and returned to school without having exercised any precautions; and the contact cases, or those who have illness at home or in one way or another have been exposed to contagion. There are also normal people, who may carry pathogenic germs in their throats.

Kirchner, from an investigation in Prussia, has shown that in the first year of life, whooping cough, measles, and diphtheria are the prevalent contagions. In the second year, measles, diphtheria, whooping cough, and scarlet fever head the list in the mortality rate, and tuberculosis occupies fifth place. From the third to the fifth year tuberculosis occupies fourth place, sixth to the tenth year third place, and from the eleventh year on, first place. These statements were corroborated by investigations in the United States by Dr. Samuel G. Dixon.

All children who are known to belong to families having consumption or who live in a house where the disease exists should be examined by expert diagnosticians immediately upon development of a persistent cough or evidence of general failure of health and strength. When a case of tuberculosis is found the questions of early treatment and the advisability of exclusion are important for the consideration of the medical inspector.

Use of Terms.—The following terms in use are more or less confusing to both physician and layman: "infection," "contagion," "communicable," "transmissible."

An "infectious disease" is one due to a special organism, and may be transmitted to others through various channels. All infections are not contagious. Typhoid fever, for instance, is an infection but not a contagion.

A "contagious disease" is one that is transmitted from sick to well by contact. This term is more often used to designate the eruptive fevers, where recognition is based on a period of incubation, mode of onset, clinical course, and a respective eruption which is peculiar to that disease. These are smallpox, varicella, measles, rubella, and scarlet fever.

A "communicable" or "transmissible" disease is one which can be conveyed to another. It may or may not be due to a specific microörganism, and it is not necessary to have actual contact with a previous case. Rabies is a transmissible disease but not a contagion; malaria is transmissible through the mosquito, but cannot occur from contact with one suffering with the disease.

A "specific infection" is one due to a special microorganism common to that disease only. These diseases breed their own kind, as in the tubercle bacilli, causing tuberculosis and no other infection.

Methods of Transmission.—The methods of transmission of infection from the sick to the well are:

1. Direct contact with sick.
2. Through the air.
3. Germs adhering to clothing, furniture, or other articles.
4. Infection of food and drink.
5. Insects, such as flies and mosquitoes.
6. Infected earth, as in tetanus.
7. Domestic animals.

Bacteria may gain entrance into the body and infect through the following channels:

1. The digestive tract. Microörganisms may gain entrance to the system with food or drink, as may occur with typhoid fever, tuberculosis, and dysentery.

2. The respiratory tract; tuberculosis, pneumonia, and influenza are examples.

3. The skin. It is doubtful whether the unbroken skin can admit bacteria. When this apparently takes place there is probably a wound so small as to be practically invisible. The skin is the channel of infection in rabies and tetanus. Tetanus is a form of "intoxication" in which the germs remain at the seat of the wound and there form toxins which enter the system.

4. Heredity. There is no doubt of the transmission of infection to the fetus. This may be from either parent, at the time of conception, as in syphilis, or at a later period from the mother. Smallpox, measles, pneumonia, scarlet fever, tuberculosis, and other diseases are capable of such transmission.

Methods of Detection of Infection.—It is physically impossible for a physician to examine each pupil daily, and even were it possible, a child who presented no suspicious symp-

toms upon examination might within a few hours have marked signs of a contagious disease. One of the chief means for detecting cases in school is the alert, instructed teacher who sends every child with the least suspicion of an acute illness to the medical inspector for a diagnosis. By "instructed teacher" is meant one who can recognize the common signs of prevalent diseases, such as in a child vomiting, the possibility of its being a symptom of one of the acute infections instead of passing it by as a simple case of indigestion. She will also notice and understand the usual bright, attentive child who suddenly becomes languid and "heavy-eyed," flushed, and feverish-looking is a case for inspection by the school doctor.

The medical inspector may aid in keeping his schools clear of epidemics and at the same time interest the teachers to coöperate by occasional lectures on the diseases of childhood. The health department can also help by issuing "A Circular of Instructions for Teachers" which should tell which children to send to medical inspectors and why.

Class-room inspections by allowing the pupils to pass in front of the doctor while standing with his back to a window takes but a few moments and often nets one or more cases of contagion. This is also the best method to adopt when a case has been found and it is desired to trace any possible contact cases. If it was diphtheria, the throat of every child in the school can be inspected and suspicious throats cultured. If scarlet fever was found, the doctor should examine the face and hands of every child for peeling of the skin. The author has on several occasions entered a school just when recess was over, and standing at the head of the stairs isolated a case of contagion, while the children filed up to their class-rooms.

All pupils who are absent from school for three or more

days without bringing a written excuse, and, if ill, a certificate from the attending physician, should not be allowed to take their seats in the class-room until passed upon by the inspector.

The nurse while assisting the teacher or the doctor in preliminary examinations may occasionally detect a suspicious case which should be referred to the physician.

Some of the subacute or chronic infections, especially of the skin, such as scabies, favus, and trachoma, are often detected while making a complete physical examination.

Action Taken by Medical Inspector upon the Detection of a Case of Contagion in Class-room.—A pupil suffering from a contagious disease, even when it is a latent or extremely mild case, should be immediately excluded from the school, and instructed to go home and not linger around the school yard or neighborhood. The child is given a special card, stating the disease suspected and ordering the parents to consult a physician.

The central office of the Bureau of Health is notified by telephone the name and address of pupil, the location of school and disease found. This telephone message is verified by a postal designed for reporting transmissible diseases.

The Medical Inspector should then make a class-room inspection in the room occupied by the infected child. This class is then dismissed for the day if the disease is scarlet fever, diphtheria, or smallpox. If the case is found in the morning the entire school can be dismissed at the end of this session to admit of disinfection during the afternoon hours. This procedure allows the janitor to open the windows in the evening after eight hours' action of disinfectant, and makes it possible to resume school the following morning. Instructions for such action should come through the Superintendent of Education or his assistants.

The office records should be consulted to see if any other member of the same family or persons living in the same house are attending that school, and, if so, such children should be excluded as "contact cases." Further action at the home of the pupil is a responsibility of the health department and its division of contagious diseases.

If the case found is measles, rubella, varicella, mumps, or whooping cough, the child should be excluded and the class inspected for more cases. The school, however, need not be closed for disinfection, but the health department should be notified in the usual manner. If a number of successive cases are found in the same school, the following week-end holiday or an intervening legal holiday can be utilized to disinfect the building. This method prevents an unnecessary interference with the school-work.

If a child suffering from diphtheria is found in the class-room, it may be advisable to take a culture from the throats of the children seated nearest to him. In all cases, however, a culture should be made of the cases diagnosticated. This may prove of value in cases of disputed diagnosis.

If scarlet fever has been found, the inspection should include the hands and face of the pupils for possible peeling of skin, also marked erythema of the throat. Teachers in class-rooms where cases have been found should be instructed to be on the watch for suspicious cases.

Exclusions and Quarantine.—When the school inspector is doubtful of his diagnosis in a suspicious case of contagion, he should exclude the child and by telephone notify the health department that he has excluded a suspicious case and desires the diagnosis of the contagious disease inspector or one of the consultants. Philadelphia maintains four diagnosticians or experts on contagions diseases for such diagnosis.

In all cases where a child is excluded, principal and teacher should be notified and a record made on blanks furnished. The quarantine of the home of the pupil and after care is the duty of the health department through its corps of contagious disease inspectors.

It is the duty of the school medical officer to know the period of exclusion for the various transmissible diseases, as prescribed by statute or by rules and regulation of the health department and the board of education. In some cities these periods vary according to rules of the board of education or State laws.

When the children excluded are permitted to return to school, the principal should receive from the medical inspector a printed postal stating the date of return, and he should send a second postal to notify the child's family.

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES.
BUREAU OF HEALTH, ROOM 712, CITY HALL.

Philadelphia, ...191....

To the Principal of

.....*School.*

Exclude from School *all persons residing with the family of*

.....

No......*Street, who is suffering with* ....., *until a Medical Inspector certifies that the period of exclusion has ended.*

The following persons attend your school.....

.....

By order of the Board of Health.

.....

Per..... *Chief Medical Inspector.*

Medical Inspector.

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES.
BUREAU OF HEALTH, ROOM 712, CITY HALL.

Philadelphia,.....191....

To the Principal of

.....School.

The period of exclusion from school of all persons residing with the family of

..... No.....Street,

who has been suffering from.....having expired, said persons are permitted to return to school on.....

By order of the Board of Health.

Per.....*Chief Medical Inspector.*

Medical Inspector.

BUREAU OF HEALTH.
CITY HALL.

Philadelphia,.....191....

Sir:

You are hereby notified that notice has been sent to.....*School, permitting the return of your child on*.....

Per.....

Medical Inspector. *Chief Medical Inspector.*

Periods of Exclusion Prescribed by the Legislature of Pennsylvania.—"No child or other person, suffering from anthrax, bubonic plague, cerebrospinal meningitis (epidemic), cerebrospinal fever (spotted fever), asiatic cholera, smallpox (variola, varioloid), typhoid fever, yellow fever, relapsing

fever, or leprosy, or residing in the same premises with any person suffering from any of said diseases, shall be permitted to attend any public, private, parochial, Sunday, or other school, etc. Such exclusion to continue for a period of thirty days following the release, by reason of the recovery or death, of the person last afflicted in said premises; or his or her removal to a hospital, the removal of quarantine and thorough disinfection of the premises.

Scarlet Fever (Scarlatina, Scarlet Rash).—The period of exclusion is thirty days following the removal of quarantine and the disinfection of the premises wherein such child or other person resides. If the person afflicted has not been properly isolated during the quarantine period, such exclusion period shall continue for ten days.

Diphtheria.—The period of exclusion from school of a child suffering from diphtheria and all other children in the same premises is twenty-one days from the date of onset of the disease in the last person afflicted; or fourteen days from date of onset provided that antitoxin has been used for the treatment of the person or persons so afflicted, and the inmates. And further provided, that two negative bacteriological cultures have been secured from the diseased area of the person last so afflicted, on two successive days. The children may then be readmitted to school after the removal of quarantine and disinfection of the premises.

Mumps, Measles, German Measles, or Chickenpox.—For these diseases the period of exclusion shall be twenty-one days from the date of reporting the case, and disinfection of premises, except when any of the inmates not afflicted after thorough disinfection of clothing shall take residence in other premises, the period of exclusion shall be fourteen days from such removal.

Whooping Cough and Erysipelas.—Cases are to be excluded for a period of thirty days.

By rule of the Bureau of Health, in contagious diseases, persons can leave a quarantined house only after an antiseptic bath and disinfection of clothing, and they must not return to the infected house. Where this rule is disobeyed, the entire house to which they move is disinfected and all school children in such premises are excluded from school two weeks.

Placards.—In Philadelphia, the following contagious diseases are placarded—diphtheria, scarlet fever, smallpox, measles, typhoid fever, cerebrospinal meningitis, anthrax, anterior poliomyelitis, and glanders. Yellow placards with black letters are used in all cases except measles, typhoid fever, anterior poliomyelitis, and cerebrospinal meningitis, when white placards with black letters are used.

Placards must be placed upon the front and rear entrances to the building and remain there until the case is terminated by death or recovery, and the house has been disinfected by the Bureau of Health.

When a contagious disease occurs in an apartment house, or where more than one family occupies a dwelling, the entrances to the building must be placarded, not the apartment where the case is confined.

As a rule, families with contagion in the household can be trusted to observe the rules of the health department to prevent spread of the contagion. In these cases, placards and general supervision is all that is necessary, but where rules are disobeyed and carelessness exists, the case should be removed to a hospital for contagious diseases or the home quarantined with police officers on guard.

Scarlet Fever.

All persons not occupants of this house are notified of the presence of scarlet fever in it, and are warned not to enter it until this notice is removed. The person sick with scarlet fever must not leave the house as long so this notice remains here.

Notice to the Milkman.

Milk dealers must not remove bottles from premises where any contagious disease exists without permission from the Bureau of Health.

By order of
The Board of Health.

The Act of Assembly, approved May 14, 1909, provides that the removal, defacement, covering up, or destruction of this placard shall be punished by a **fine** of not more than $100 or by **imprisonment** of not more than thirty days, or by both.

Disinfection.—Disinfection of schools as in other buildings consists in closing all windows and doors, all openings and cracks with glued paper, and liberally sprinkling on the floors, formalin alone or mixed with other drugs to increase its effectiveness. The building should remain closed for at least eight hours after disinfection. The janitor should be previously notified to remove from the rooms all plants and aquaria.

An interesting investigation by Dr. W. R. Stokes and Dr. H. W. Stoner, of Baltimore, on the efficiency of formalde-

hyde gas in preventing the spread of communicable diseases, shows that formalin permanganate method requires the use of 300 c.c. of formalin for every 1000 cubic feet of air space. They also found that the efficacy of disinfection is increased by a high relative humidity and in any event must not be lower than 60 per cent. or the disinfection is unsatisfactory. This is also the case if the temperature is below 65° F. A method of disinfection known as the formalin-aluminum sulphate-lime method is prepared as follows: Mix twenty to twenty-five pounds of commercial aluminum sulphate in five gallons of hot water, which is mixed in turn with fifteen gallons of formalin; 300 c.c. of the aluminum sulphate solution is mixed with 600 c.c. of formalin; 2000 grains of unslaked lime is placed in a large bucket and the solution poured over it. This causes a rapid evaporation of the formaldehyde gas with moisture. The experiments prove the destruction, if humidity is above 65 per cent., of non-spore-bearing organisms as Bacillus coli, Bacillus pyocyaneus and typhosus, also the Bacillus tuberculosis.

Absentees and Contagion.—Every child who is absent from school for a number of days should be carefully examined for signs of peeling or discharges from ears or nose. These signs are more significant if the child vomited on the day before absence.

To avoid contagion from diphtheria, cultures should be made from the throats of these absent pupils upon return, and any bacteriological evidence of diphtheria should be ample cause to exclude the child. The dangers from diphtheria carriers should be always kept in mind, and every precaution taken to prevent contagion.

The importance of examining children absenting themselves for several days is shown by the following report from New York City:

Medical Inspection and Examination of School Children.

General Contagious Diseases Found at Home on Absentee Visit.

	1911						1910						1909					
	New York City	Manhattan	The Bronx	Brooklyn	Queens	Richmond	New York City	Manhattan	The Bronx	Brooklyn	Queens	Richmond	New York City	Manhattan	The Bronx	Brooklyn	Queens	Richmond
Diphtheria	54	21	1	25	..	7	71	40	2	15	3	11	71	41	2	19	1	8
Scarlet fever	258	102	12	135	3	6	371	140	17	132	8	20	207	91	11	81	12	12
Measles	829	489	5	324	2	9	1,280	520	28	619	32	81	1,194	486	45	416	43	204
Chickenpox	841	437	14	323	6	61	659	298	18	220	13	110	744	396	47	243	6	52
Whooping cough	531	241	6	173	..	111	415	130	4	179	1	101	367	154	27	164	7	15
Mumps	405	220	4	164	4	13	243	159	1	64	2	17	316	139	22	137	15	3
Tuberculosis	7	....	..	5	..	2	1	....	..	....	..	1	3	2	..	....	..	1
Total	2,925	1,510	42	1,149	15	209	2,986	1,287	70	1,229	59	341	2,902	1,309	154	1,060	84	295

Smallpox.—This disease is very rare among school children in cities where medical inspection is established, thanks to the wise laws that make vaccination compulsory for school children. It is unnecessary to devote any space to a defence of vaccination in order to convince a legally qualified physician, but there are cases when stubborn parents can be induced to submit their children to vaccination without invoking the laws, by a tactful explanation on the part of the medical inspector. For this reason, it would be well for every inspector to acquaint himself with the contents of a circular entitled "A Message from the Medical Society of the State of Pennsylvania," a plain talk on vaccination.

Symptoms.—The physical signs and symptoms of smallpox can be studied from any text-book on diagnosis or works devoted to infectious diseases.

After an exposure to the contagion, and a period of incubation of ten days to two weeks, severe general symptoms manifest themselves, especially high temperature, backache, headache, delirium, and vomiting. A prodromal eruption appears, which is composed of erythematous or hemorrhagic spots occurring chiefly on the abdomen and inner sides of the thighs; this diminishes in a few days at the same time that the fever and general symptoms subside. The characteristic rash now appears, first on the scalp and face, then on the trunk, arms, and legs in the form of small, red nodules which increase in number and size and develop into vesicles with clear contents. The temperature again rises and the contents of the vesicles become cloudy and a small depression or umbilication forms in the centre of the pustules. These remain discrete or run together if much of a rash exists. The rash is especially abundant and confluent on the face and hands. The mucous membranes of the eyes, mouth, and throat may be involved. In favorable cases

PLATE VI

Revaccination.
7th day.

Primary Vaccination.
8th day.

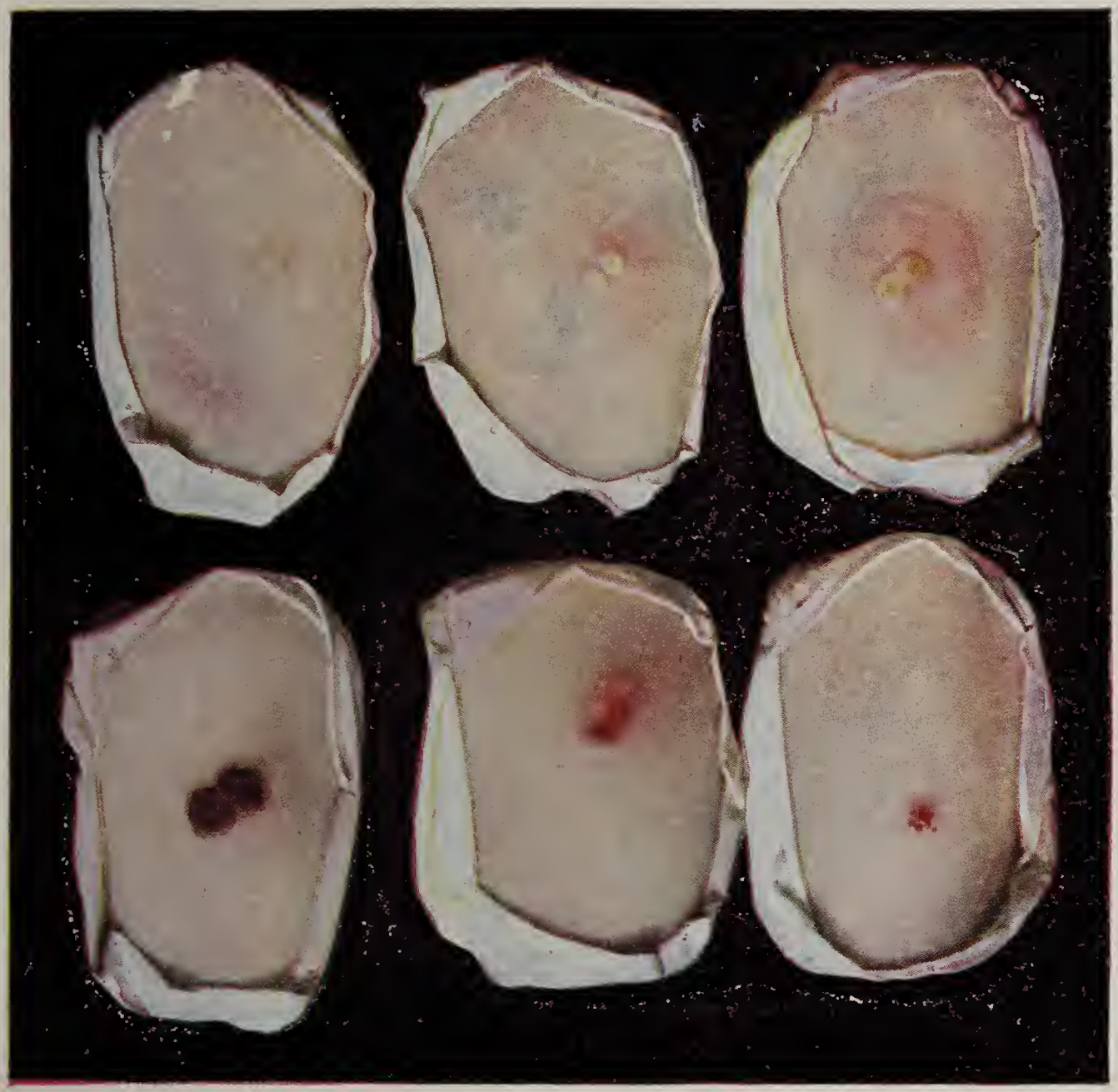
Revaccination.
7th day.

Revaccination.
7th day.

Revaccination.

From Polyclinic Collection of Drs. Schamberg and Wallis. Wax Models made from Life by Dr. J. F. Wallis.

PLATE VII



Evolution of Primary Vaccination.

4th day. 6th day. 8th day.

Crust 20th day. Scar 28th day. Spurious result.

From Polyclinic Collection of Drs. Schamberg and Wallis. Wax Models made from Life by Dr. J. F. Wallis.

the pustules begin to dry and form crusts in twelve to fourteen days, and separate in three or four weeks, leaving typical scars. The period of infection may last somewhat longer.

Diagnosis.—The eruption in a fully developed case is typical of this disease only. It is to be suspected only in an unvaccinated person or one not vaccinated for a number of years. The diseases mistaken for smallpox are chickenpox, measles, and syphilis.

The medical inspector, especially in times of an epidemic of this disease, should be suspicious of every child having a doubtful vaccination, or on whom there appears a rash similar to smallpox with signs of acute illness. Chickenpox, varicella, must not be diagnosticated at such times unless every evidence eliminates the possible mild case of smallpox.

The diagnosis is sometimes extremely difficult in the early stages. The greatest importance should be attached to previous and recent successful vaccinations as seen by remaining scars. Pustular syphilis generally has a history of such infection and other specific manifestations on close examination. In chickenpox, the general symptoms are mild, the prodromal eruption and umbilication of vesicles are absent, and different stages of development of the eruption are present at the same time. Measles is occasionally mistaken for smallpox, but the eruption is papular, more confluent and does not advance to vesicular or pustular stage. There are marked respiratory symptoms and the general symptoms are milder.

Vaccination.—Prophylaxis of smallpox is vaccination. The time to vaccinate is in the first year of life unless there are cases of smallpox in the city, when it should be performed at any age. All people who have come in contact with a case should be vaccinated irrespective of age or time that has intervened since the previous vaccination. The inti-

macy of the contact is not to be considered. Vaccination has a five-day incubation period and smallpox twelve. Thus there is one week's gain on the disease by an early diagnosis, immediate quarantine, and vaccination of all contacts. Most contacts, if vaccination is successful, will not be infected, or if so, will result in a mild case.

A vaccination is a typical sore on the skin produced by infection with the virus of vaccine, with a resultant white, cribriform scar. A sore arm due to infection with streptococci or other germs does not mean a vaccination. The only absolute test of the efficiency of a vaccination to protect against smallpox is the failure of subsequent vaccinations when properly performed with potent virus.

A successful vaccination can generally be told by the course of the appearance of papule, vesicle, pustule, and after-scar. Vaccination should be repeated once in seven years, and at other times when an epidemic of smallpox exists. This does not mean that the period of protection lasts but seven years. The time varies greatly and may extend over fifteen or even twenty years. The period of seven years simply keeps one within the lines of safety.

The Operation of Vaccination.—Choose a reliable virus, one that is fresh, and within the age limit set by the manufacturer. Heat destroys vaccine virus, therefore it should be kept in a cool place. The best part of the body for the operation is on the left arm, over the deltoid muscle. The leg may be chosen in the case of a female, but this site is more susceptible to infection. The part should be cleansed with soap and water, dried, and washed with alcohol. Then scrape the upper layer of skin with a knife, needle, or scarifier over not more than an eighth of an inch of surface, until there is a slight oozing of serum, not blood. If ivory points are used, the virus is then rubbed into this area. If glycerinated tubes, the virus is blown into the area by means

of the tubes or bulb furnished with the virus. Never use the lips to blow on the virus. The arm should remain bare a few minutes to allow the virus to dry, when a few turns of a gauze bandage may be placed around the vaccinated area. Discourage the use of shields.

Legislation.—Most States and cities have some laws which either make vaccination mandatory among school children or give equal powers to the enforcement of such measures.

The school law of Pennsylvania has a special provision for vaccination.

"All principals or other persons in charge of schools as aforesaid are hereby required to refuse the admission of any child to the schools under their charge or supervision, except upon a certificate signed by a physician setting forth that such child has been successfully vaccinated, or that it has previously had smallpox."

"Any physician, undertaker, principal, superintendent of a Sunday school, sexton, janitor, head of a family, or any other persons or persons named in this act who shall fail, neglect, or refuse to comply with or who shall violate any of the provision or requirements of this act, shall for every such offence, upon conviction thereof before any mayor, burgess, alderman, police magistrate, or justice of peace of the municipality in which said offence was committed, be liable to a fine or penalty thereof of not less than five dollars, nor more than one hundred dollars, which said fines or penalties shall be paid into the treasury of such municipality, and in default of payment thereof, such person or persons so convicted shall undergo an imprisonment in the jail of the proper county for a period not exceeding sixty days."

The State of Massachusetts has a statute that has been a school law since 1855:

"A child who has not been vaccinated shall not be admitted to a public school except upon presentation of a certificate

granted for cause stated therein, signed by a regular practising physician that he is not a fit subject for vaccination."

One of the most salutary effects of medical inspection has been the enforcement of vaccination laws which previously had been neglected. First inspections by inspectors show, especially outside of large cities, large numbers of pupils unvaccinated. In all of these cases the physicians have insisted upon the observance of the laws and vaccination has become general.

Every child that has received a successful vaccination, or on examination shows a recent mark or signs of having had smallpox, should be furnished with a certificate which should be kept on file at the school.

Form of vaccination certificate used in Philadelphia.

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES.
BOARD OF HEALTH.

Physician's Certificate.

Philadelphia.....191.....

I hereby certify from personal examination that

..... *Age* .....

Residence .....

is successfully vaccinated, or has had Smallpox.

.....*M. D.*

.....*Residence.*

(OVER)

REGULATIONS OF THE BUREAU OF HEALTH OF PHILADELPHIA.

Authorized by an Act of Assembly
Approved June 18, 1895, and April 20, 1905.

Section 14. All principals, superintendents, or other persons in charge of schools, as aforesaid, are hereby required to refuse the admission of any child to the schools under their charge or supervision, except upon a certificate signed

by a registered physician setting forth that such child has been successfully vaccinated or that it has previously had smallpox.

Such certificates of vaccination shall not have been issued sooner than five days after the performance of the operation, nor without personal inspection of the site of the operation by the physician issuing the certificate.

Section 15. All principals or other persons in charge of schools, as aforesaid, are hereby required upon notice from the Bureau of Health to refuse the admission of any child of twelve years of age or over to the schools under their charge or supervision, except upon a certificate signed by a registered physician, setting forth that such child has been revaccinated within a period of four (4) years from the date of its application for readmission, and giving the results of the operation.

The penalty for violation of the provisions of this section is punishable by a fine or by imprisonment.

A medical inspector should never vaccinate a child in school without having obtained the written permission from a parent or caretaker. The following form is suited for obtaining such permission:

Philadelphia,.....191.....

BUREAU OF HEALTH: I hereby request the vaccination of

.....

residing at.....a pupil of .....School.

.....

Parent or Guardian.

Vaccinated.....191

Inspected 191

Result { Successful / Unsuccessful .....

Medical Inspector.

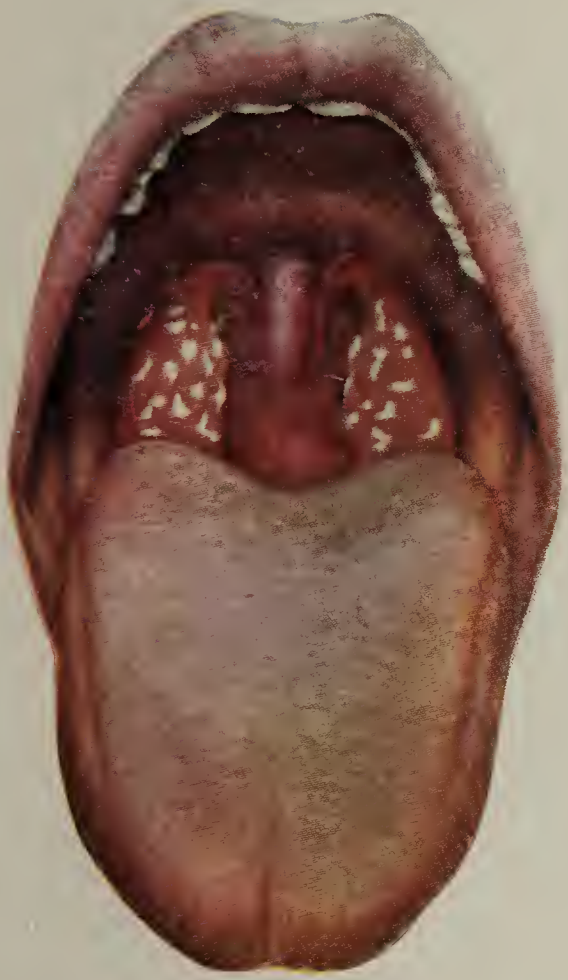
Diphtheria.—Diphtheria is contracted by inhaling the expired breath of a case of the disease, or a diphtheria carrier (a clinically normal throat with the virulent germs in it), or from air contaminated by the germs from infected clothing or discharges from the ears, nose, and throat.

Diagnosis.—Diagnosis is made by the characteristic exudate forming a membrane on tonsils and pharynx or in nares or larynx. The other diseases resembling diphtheria are pharyngitis and follicular tonsillitis. Where a clinical diagnosis cannot be made, bacteriological cultures should be taken.

All children with sore throat should be looked upon with suspicion, and diphtheria excluded only after laboratory examination shows an absence of the diphtheria bacilli. A trained eye can more often diagnosticate diphtheria from a follicular tonsillitis when exudate is present. A follicular tonsillitis shows dotted white glistening exudate covering tonsils only. These plugs of secretion can be removed from the holes with a probe without bleeding. Diphtheria is found as a dirty gray dull membrane which covers more or less space on tonsils and spreads to vault and uvula. Attempts at removal with a probe are difficult, and cause bleeding. All sore throats with or without membrane should be cultured, and the child excluded from class-room until results of culture are known. Quarantine in diphtheria must be maintained so long as microscopic examination shows the presence of the diphtheria germs.

Diphtheria Carriers.—Diphtheria carriers are people who show no signs or symptoms of the disease, but in whose throats are the germs of diphtheria. They are most dangerous individuals and can readily transmit the disease to others. When found on a school child, the child is excluded from school, the family notified to isolate the case, and, if

PLATE VIII



1

2

1. Follicular Tonsillitis.

2. Diphtheritic Throat.

no physician is called, the medical inspector should take cultures. When a negative culture is obtained from nose and throat, the room occupied by the child is disinfected and the child may return to school.

The use of the term "school" legally includes public, parochial, private, and Sunday schools.

FIG. 31

Culture for laboratory diagnosis of diphtheria.

Cultures.—All health departments of large cities are equipped with a laboratory for examining cultures. These culture outfits, which should be part of the outfit of every school inspector, consist of a package containing two test-tubes—one tube containing a sterile swab of cotton on an applicator—the other, the culture media. The physician rubs the swab of cotton over the diseased area and then rubs it on the surface of the culture medium without breaking the surface. The cotton plug is returned to the tube and with the required data of information the outfit is sent to the laboratory. As it takes twenty-four hours for the

result of such examinations, the physician should make every effort to diagnosticate the case on clinical signs and symptoms.

Antitoxin.—There should be no need to enter into any discussion as to the value of antitoxin as a preventive, and curative agent in diphtheria. It is the delay in its use that endangers the life of the patient. In the Philadelphia Hospital for contagious diseases no case has died that has received a dose of antitoxin in the first twenty-four hours of the disease. Before antitoxin was discovered the death rate from diphtheria was 30 to 50 per cent. Since the use of antitoxin the mortality is but 10 per cent. Many cities furnish antitoxin free, and upon request, medical inspectors to administer it. Since February, 1913, New York City no longer permits the administration of antitoxin by the inspectors, although the serum is furnished free upon request.

Scarlet Fever.—Scarlet fever is more often found by the school physician in the early stages when the child has a mild erythema and pharyngitis with accompanying early symptoms of vomiting and fever or in the stage of desquamation. A child vomiting in the class-room should be looked upon with suspicion, carefully examined, and, if necessary, excluded for a day or so.

Scarlet fever is to be diagnosticated from pneumonia, pharyngitis, indigestion, measles, and diphtheria in early stages. It is the mild cases with few symptoms that return after an absence of a few days from school, that infect many others and cause epidemics.

Scarlet fever must be quarantined for a period of not less than thirty-five days from the date of reporting the case to the Bureau of Health by the attending physician or others. All cases must be examined by an inspector when the case

is declared terminated by the physician. Examination is especially made for peeling or desquamation, also discharges from nose and ears. Desquamation of soles of feet and palms of hands takes place later than other parts of the body.

FIG. 32

Well-marked desquamation upon the dorsum of hands and fingers of a case of scarlet fever. (Welch and Schamberg).

Measles.—No other infectious disease is more frequently found in the schools by the physicians than measles. This is partly due to the ignorance of some parents in believing measles not serious, and that all children must get it, and partly to their mistaking the respiratory symptoms as a mere "cold." A pupil with "watering eyes," lacrymation, sneezing, coryza, and cough should be looked upon with suspicion. By these symptoms a diagnosis can

often be made previous to the rash appearing and the child can be excluded. This disease more than any other one of childhood, plays havoc in a school by its rapid dispersion. Koplik's spots may be seen, but are more often overlooked. The characteristic papular eruption beginning on the forehead, neck, and wrists, together with respiratory symptoms, cannot be mistaken for any other disease. Diagnosis in the early stages must be made from scarlet fever and diphtheria.

Quarantine for measles should be instituted as early as possible. This must be continued for fourteen days, and the child kept from school for one week more, a total of twenty-one days. The same period of exclusion should be enforced on those of the family exposed and who have not previously had measles.

Rubella, German Measles.—Rubella, German measles, occasionally found at school, must be diagnosticated from scarlet fever. Rubella is much milder in its symptoms, the rash is papular instead of the erythema, and there is a swelling of the cervical glands.

Varicella.—Varicella, chickenpox, next to measles, is one of the contagions most frequently met with at school. The child is seldom sick enough to remain home. The rash, varying in size, in all stages of papules, vesicles, pustules, and crusts, superficial in character, makes a clinical picture characteristic of this disease. Care must be exercised in diagnosis when smallpox is prevalent.

Pertussis.—Pertussis, whooping cough. Teachers are apt to send to the medical inspector, with a diagnosis of whooping cough, every child that coughs. The frequency of these mistakes should not make the physician any less alert in diagnosticating these cases. If the child has the typical "whoop," with vomiting, etc., the diagnosis is easy; but to

PLATE IX

3

4

3. Strawberry Tongue.

4. Koplik's Spots.

PLATE X

Fig. 1

Fig. 2

Fig. 3

Fig. 4

The Pathognomonic Sign of Measles (Koplik's Spots).

Fig. 1.—The discrete measles spots on the buccal or labial mucous membrane, showing the isolated rose-red spot, with the minute bluish-white centre, on the normally colored mucous membrane.

Fig. 2.—Shows the partially diffuse eruption on the mucous membrane of the cheeks and lips; patches of pale pink interspersed among rose-red patches, the latter showing numerous pale bluish-white spots.

Fig. 3.—The appearance of the buccal or labial mucous membrane when the measles spots completely coalesce and give a diffuse redness, with the myriads of bluish-white specks. The exanthema on the skin is at this time generally fully developed.

Fig. 4.—Aphthous stomatitis apt to be mistaken for measles spots. Mucous membrane normal in hue. Minute *yellow points* are surrounded by a red area. Always discrete.

avoid unjustly excluding a case of bronchitis for whooping cough requires skill on the part of the inspector. The typical cough can be produced in a suspicious case by having the child run up and down the playground a few times. Cases of whooping cough are excluded from school for thirty days

Fig. 33

Mumps.

from the date of reporting to the health department. The other children in the family, if unaffected, are not excluded.

Mumps.—Mumps is a highly contagious disease, most prevalent in children. For the first ten months of 1912, 1764 cases were reported to the health office in Philadelphia.

The disease develops in two to three weeks after exposure. The early symptoms are fever with pain below the ear on one or both sides; a slight swelling below one ear may be noticed. In a day or two there is a decided enlargement of the neck and side of the cheek, which spreads to the other side of the face. The swelling persists for seven to ten days and gradually subsides. The typical swelling of the parotid gland is easily diagnosticated. Abscess from carious teeth can be diagnosticated by the location of the swelling, and the presence of decayed teeth.

Quarantine for mumps should be twenty-one days from the date of reporting to the Bureau of Health. Children exposed to the disease must be excluded from school for three weeks following last exposure.

Syphilis.—Syphilis in its hereditary form is more common among children than is accredited to the disease. The eruption when present is rarely on the uncovered part of the body. The child may show the anemic, undeveloped appearance characteristic of some cases. Iritis may be the most prominent sign, and Hutchinson's teeth and frequent attacks of nasopharyngeal catarrh may be found. Glandular enlargement is often present. This disease is not uncommon among the subnormal and mentally defective children.

Tuberculosis.—The relation of the school physician and cases of tuberculosis among school children is one that does not necessitate an extended study in a volume of this kind. The school medical officer is not permitted to undress a child to make a thorough physical examination, nor has he the means at his command for laboratory examinations. He can, however, label a child "suspicious tuberculosis," and refer the case to the family physician or a dispensary for a thorough examination and treatment. The school physician may recognize the "predisposed" pupils and advise open

air or cold-room schools. He may interest the parents to a more healthful outdoor life for the child and the nurse may

FIG. 34

Hutchinson's teeth. (Stowell.)

investigate home conditions and remedy many defects that may benefit the child. Cases of tuberculous joint or bone

disease are met with in various stages and should be referred for treatment to one of the orthopedic dispensaries. All cases of tuberculosis in children are excluded by law, in many States, from attendance at school. Some of these children can receive an education and at the same time improve their physical condition by attending open-air schools. The active tuberculous child, however, has no right to attend any school. The physicians should be acquainted with all the early signs and symptoms of tuberculosis and try to recognize the early cases and those predisposed to the disease. He has the opportunity of playing an important part in the campaign for the prevention of tuberculosis.

PART IV.

PHYSICAL DEFECTS.

GENERAL CONSIDERATIONS.

While the essential object of school inspection is the detection of contagious diseases among the pupils, of no less importance is the diagnosis and correction of physical defects. The medical inspector in his routine visits to the schools, has sent to him by principal, teachers, and nurse, pupils who have some signs or symptoms suspicious of a contagion, and those who have evident physical defects, which seem to hinder their physical and mental development. These cases are also detected by the physician in his class-room inspections and thorough individual examinations. The physical status of each pupil, at least once a year, is noted on record cards described under the chapter of "Records and Record Keeping."

After the medical inspector has visited his schools and disposed of the cases that may be sent to him, he proceeds to the school where he intends making complete physical examinations. Here he examines ten or more pupils and records the results and recommendations. The inspection for evidence of successful vaccination is best done at the beginning of the school term for all pupils. Thereafter, all newly admitted pupils are examined on a certain day each

week, agreed upon by the principals and the doctor. The physical examinations are preferably started in the highest grades and proceed to the lower. If the older pupils are promoted to other schools their examination has been accomplished, and the records of physical examinations may be transferred with the pupil. Any defect noted and not corrected may then be followed up by the physician in such school.

The frequency of the various defects found in the schools of different cities is of interest as well as a guide for comparison of results.

CITY OF PHILADELPHIA, 1911. SUMMARY OF WORK PERFORMED BY MEDICAL INSPECTORS IN PUBLIC SCHOOLS.

Number of schools visited	Average	238
Number of visits to schools		18,306
Number of major contagious diseases found in routine examinations		632
Number of pupils excluded		4,755
Number of pupils instructed and referred to nurse		48,335
Number of individual examinations		59,159
Total number of vaccinations		5,989

SUMMARY OF EXCLUSIONS.

Diphtheria	81	Conjunctivitis	829
Diphtheria contact	27	Scabies	214
Scarlet fever	59	Impetigo	427
Scarlet fever contact	11	Miscellaneous	399
Measles	117	Tonsillitis	42
Varicella	215	Measles contact	10
Pertussis	28	No vaccination mark	2
Mumps	94	Trachoma	4
Pediculosis	1,934	Measles suspect	2
Ringworm	255	Favus	5

Method of Inspecting Pupils.—The physician should have a routine method of conducting the physical examinations. Besides his other duties, he is supposed to make from ten to twenty physical examinations each day. These examinations, depending upon the ability of the inspector and the thoroughness of the inspection, take from ten to twenty minutes for each pupil.

CITY OF CHICAGO PHYSICAL EXAMINATIONS OF SCHOOL CHILDREN. SUMMARY FOR THE YEARS 1909, 1910, AND 1911.

	1909	1910	1911	Totals (3 yr.)	Per cent. of totals examined
Number of pupils examined	123,897	120,301	73,405	317,603	....
Number having physical defects	63,199	53,868	31,230	148,297	46.6
Per cent. found defective	51	44.8	42.5	46.6	....
Defects found—					
Teeth	44,483	43,922	27,676	116,081	36.5
Tonsils—hypertrophy of	27,556	24,286	15,097	66,939	21.1
Eye—vision impaired	21,824	18,941	11,524	52,289	16.4
other defects of	32	439	905	1,376	0.4
Glands—enlargement of	16,945	16,639	11,459	45,043	14.1
Adenoids	4,088	4,702	3,465	12,255	3.8
Nasal breathing impaired	6,524	5,032	3,380	14,936	4.7
Anemia	3,606	2,979	1,666	8,251	2.5
Nutrition	2,983	2,399	1,576	6,958	2.2
Skin diseases	2,593	1,955	1,451	5,999	1.9
Ear—hearing impaired	2,830	1,916	959	5,705	1.7
discharging	13	208	363	584	0.2
Goitre	50	335	630	1,015	0.3
Palate defects	273	422	498	1,193	0.4
Orthopedic defects	1,433	916	417	2,766	0.9
Heart diseases	816	576	290	1,682	0.5
Nervous diseases	486	564	277	1,327	0.4
Lung diseases	425	173	153	751	0.2
Rachitic type	23	124	204	351	0.1
Mentally impaired	615	313	184	1,112	0.3
Other defects	2	6	...	8	...
Totals	137,600	126,847	82,174	346,621	...

NEW YORK CITY. MEDICAL INSPECTION AND EXAMINATION OF SCHOOL CHILDREN. PHYSICAL EXAMINATION OF SCHOOL CHILDREN. NON-CONTAGIOUS PHYSICAL DEFECTS FOUND AND TREATED.

	1911	1910	1909
Number of physical examinations made	230,243	266,426	231,081
Number found needing treatment	166,368	196,664	172,112
Number found with other defects than of teeth only	75,857	101,602	102,150
Number found with defects of teeth as only defect	90,511	95,062	69,962
Percentage of those examined needing treatment	72%	74%	74.48%
DEFECTS FOUND:			
Defective vision	24,514	29,634	30,408
Defective hearing	1,491	1,519	2,340
Defective nasal breathing	27,316	40,946	43,393
Hypertrophied tonsils	34,639	50,012	50,934
Tuberculous lymph nodes	418	759	810
Pulmonary disease	483	656	744
Cardiac disease	1,661	2,370	1,503
Chorea	861	951	940
Orthopedic defect	1,190	1,683	1,461
Malnutrition	5,845	8,691	7,249
Defective teeth	135,843	164,250	131,747
Defective palate	85	153	324
Number reported treated[1]	65,150	64,861	84,968

As the child enters the room, the inspector notes his gait and standing posture. In a low tone he asks the pupil's name, age, address, etc., and by the promptness of the reply or the pupil asking to have the question repeated he gets a preliminary idea of the condition of hearing and sometimes mentality. He observes any abnormalities of structure, differences between right and left sides of the body; facial expression, whether mouth-breather, etc. He notes color of the skin, presence of anemia, jaundice, desquamation, rash, and cleanliness by observing face and neck from front and sides. It is not unusual to find a ringworm back of

[1] These figures do not include children reported with defective teeth as the only defect, whose treatment consisted only of instruction in oral hygiene.

the ear or on the back of the neck. He observes the hands on both sides for rash, desquamation, and cleanliness, also condition of the nails. As these observations are made while the child faces a good light near a window, the same position is used to examine mouth and throat. When the child opens its mouth, the inspector notes the condition of the mucous membrane and teeth; the presence of an odor may indicate uncleanliness of mouth, carious teeth, or naso-pharyngeal catarrh. The tonsils are inspected to see whether they are hypertrophied or if an exudate is present; then the uvula, to see if it is elongated or if signs of nasopharyngeal catarrh exist. Mouth-breathing or signs of nasal obstruction are noted. Ears are next observed for impacted cerumen or any discharge. Eyes are inspected for any of the inflammatory diseases of the conjunctiva, cornea, or lacrymal apparatus and the presence of strabismus or ptosis of eyelids. The child is requested to stand erect with feet together and hands to the sides, while the physician notes any deformities or orthopedic defects by viewing the child from all sides. Having obtained all possible data from a thorough inspection, the physician then tests the hearing and vision. The defects found by the school examiner are referred for treatment to the family physician or dispensary. Care should be exercised in statements of defects and diseases, as a great number of errors in diagnoses sent to members of the medical profession lower their estimate of the proficiency of the corps.

The eyes and ears are possibly the only parts of the body which receive an examination other than that of mere inspection. A few cities attempt to examine the chest and use stethoscopes, but information from a hurried examination through clothing is worthless.

In testing for acuity of vision, the child is placed with his

back to the light and free from any reflection from the surface of the test card. Covering the eye not under examination, generally the left, the child is asked to recognize the letters beginning with the largest type. If the child reads correctly all the letters including those on the line marked 20 feet, and he is 20 feet away, the vision for that eye is recorded $\frac{20}{20}$ or normal. If he recognizes no farther than the 40 foot line, then vision is recorded $\frac{20}{40}$, etc. The same method is adopted if meters are used for recording the acuity. If the child cannot see even the largest letter on the card, he is brought nearer until he can distinguish the top letter, when the acuity is noted by the distance of the child in feet or meters from the card used as a numerator and the designated type read as the denominator. The left eye is then tested in the same manner, after covering the right eye.

A more complete discussion and criticism of testing vision and test cards will be found under the chapter on the eyes.

Acuity of Hearing.—An accurate, scientific study of the acuity of hearing can be obtained by using one of the audiometers designed for such purposes. These instruments for school inspection are almost unknown outside of the psychological clinics and the dispensaries for diseases of the ear. The whispered voice or watch test is satisfactory, and preferred by most physicians. The child stationed about 15 or 20 feet away and with his back toward the physician, is instructed to cover one ear completely. The physician whispers in a distinct, clear voice, words, numbers, or letters, which are to be repeated by the pupil. Each ear is tested separately, and it is sufficient to note hearing, right or left ear, defective or normal.

The watch test consists in standing back of the pupil, and with one ear tightly closed he is requested to tell when he hears the tick of the watch held before the open ear.

THE EYES.

Diseases and Their Prevalence.—The examination of the eyes of school children should receive special attention from the medical examiner, as no other organ of the body has a greater influence on the child's welfare. The examination should include the eyes and their appendages, for inflammatory and non-inflammatory diseases, and defects of vision. About 10 per cent. of the cases found are diseases of the eyes, chiefly inflammatory, and the remaining 90 per cent. are defects of vision.

Any of the many diseases described in text-books on diseases of the eye may be found among school children, but there is little need of the school examiner having an intimate knowledge of the signs, symptoms, and diagnosis of all of these diseases. It is sufficient to be able to distinguish the normal from the abnormal, and to recognize the common prevalent diseases and refer the cases to a competent ophthalmologist.

Diseases may affect the eyeball, the eyelids, or the lacrymal apparatus, and those defects which can be diagnosticated by inspection are within the realm of a school inspector. Where defects exist in the hidden structures accessible only by the ophthalmoscope, as in the choroid, retina, and nerve head, they are likely to be overlooked. Several diseases of the eye show little or no outward signs of the disease, and may be recognized only by the careful examination of a trained specialist. Inflammatory diseases of the eye recognized by redness, a watery discharge, and photophobia, or inability to stand light, should be cautiously labeled. The teacher's diagnosis of "conjunctivitis," "pink eye," "inflamed eye," etc., may be a most serious case of iritis or glaucoma. Sometimes the belittling of an

"only inflamed" eye is the cause of slowly healing corneal ulcers.

Reports from various cities tell of finding acute conjunctivitis, chronic conjunctivitis, keratitis, choroiditis, cataract, pannus, etc., and as the physicians are more or less specialized on this subject, varied the list of subheadings. It is impossible to train each medical inspector to be a specialist in all branches of medicine.

In cities or towns where no physicians are employed, the nurses or teachers who perform the work should be acquainted with the gross anatomy and appearances of a normal eye, but need not burden their memories with definition, diagnosis, and pathology of the various diseases. They should also be intimately acquainted with the rules of hygiene for the eyes, should teach such rules on all possible occasions, and see that all dangerous contributing causes are removed from the school-room. The examination of the child should be thorough enough to recognize defects in the acuity of vision, inflammation of the eyes, swelling, edema, or puffiness of the lids, as well as other symptoms signifying disease. It is well to remember that these signs may mean more than a mere local affection, and may be a symptom of a more serious disease.

An acute conjunctivitis with "watering" of the eyes, associated with catarrhal symptoms, may be prodromal of measles, and occasionally in the early stages of scarlet fever or chickenpox there is an injection of the conjunctiva. Redness of the eyes with subconjunctival hemorrhages may indicate the presence of whooping cough, and the diagnosis may be confirmed by hearing the typical cough. Scarlet fever and other acute exanthemas have associated fever and characteristic eruptions.

Conjunctivitis must be diagnosticated from trachoma, a

contagious inflammatory disease of the lids. Trachoma is diagnosticated by a characteristic follicular or trachoma body appearance most marked on the conjunctiva of the upper lid.

All forms of conjunctivitis with mucopurulent secretion is contagious to a greater or less degree, and requires exclusion from school.

Most of the cases of trachoma found in the public schools have been diagnosticated as conjunctivitis, and the true condition has been later recognized by specialists. This is partly due to the school examiner confining his inspection to the lower lid, and finding no trachoma granules. Many of the cases of trachoma show little outward signs of inflammation and can be detected only upon everting the upper lid. A peculiar drooping of one or both lids, a narrowing of the slit, and a puffiness of the upper lid in an Italian or Russian child may lead one to suspect the presence of trachoma.

The cornea should always be transparent, smooth, and glistening. Keratitis or corneal inflammation makes the membrane cloudy or hazy. Corneal ulcers often begin at th margin or limbus and show as an irregularity in the otherwise smooth surface. Ulcers when overlooked may cause serious damage to the eye and permanent impairment of vision. Hazy or clouded cornea may signify a serious disease of the eye.

Unequal pupils or failure to react to light or accommodation are abnormal signs and may signify some cranial trouble. If one pupil is dilated, before looking farther for the cause the examiner should ascertain if the child has been using drops.

Puffiness of the eyelids or around the eyes may signify an organic disease of the kidneys or heart, or may be due to eye-strain or loss of sleep. Repeated attacks of inflamed

eyes, styes (hordeolum), crusts, and inflamed edges of lids generally denote the need of correcting lenses. It must be born in mind, however, that vermin, head-lice, or uncleanliness often cause crusts and inflamed edges of the lids, and can be verified by examining the scalp.

If an eye becomes suddenly inflamed, the examiner should look for a particle of dust or other foreign body on the eye or conjunctiva of the lid before seeking some more serious cause.

The treatment of a simple acute conjunctivitis or inflamed eye where there is no complication, or where a foreign body has been removed, consists in flushing the eye with a solution of boric acid (a teaspoonful in a glass of warm distilled water). This can be done with an eye dropper or the child can use an eye bath or eye cup. These small glass cups are inexpensive and can be purchased from any druggist.

Method of Examining Eyes.—The medical inspector should be most careful in his inspection of the eyes of children, as no other defect has a more important bearing on their education. Failure to recognize defective vision or some disease of the eye may mean failure to aid a subnormal or mentally defective pupil.

It is unnecessary in a volume of this size to give the definition, pathological anatomy, and symptoms of the various diseases of the eyes. Where a school physician is unacquainted with the subject he can readily refer to one of the many good text-books on the subject. The following facts, however, are important and should be known by every school inspector.

Diagnosis of diseases is made chiefly by inspection and defective vision by the use of test cards.

Inspection. The eyeballs should not be so prominent as to protrude beyond the sockets (exophthalmos). There

should be no drooping of one or both eyelids (ptosis). The margins of the lids should show no crusts, redness or swelling (blepharitis). The conjunctiva of the eye or lids should not be red, injection denotes conjunctivitis, and small papulopustular eruption on the edge of the lids constitute styes (hordeolum). Pupils in normal eyes are equal and the cornea and all media are clear and transparent. The surface of the cornea should be smooth and regular and the curvature in all directions should be the same. Breaks or irregularities of the surface of the cornea may be due to ulcers, and haziness or cloudiness due to keratitis. Growths on the conjunctiva may be due to pterygium, pinguecula, pemphigus, or tumor. Irregular shape of pupil, which in the normal eye is perfectly round, may signify a former inflammation of the iris. Iritis or inflammation of the iris is accompanied by a reddened conjunctiva. A normal lens should show no signs of opacity.

The lacrymal apparatus comprises the lacrymal glands with their ducts situated at the upper and outer angle of the orbit and its drainage system is placed at the inner edge or canthus of the eye. The passageway for the tears is through the nasal duct emptying into the nostrils. The eyes are kept moist by the secretion of tears from the glands, and all surplus secretions are carried through this duct to the nose. When one gently pulls down the lower lid, there is visible at the conjunctival margin of the lid near the inner angle the opening to the canaliculi which leads to the sac. The tears or secretion drain into this system by suction, and except when in excess from crying the tears should not roll over the cheeks. There should be no swelling, purulent secretion, or other signs of inflammation of any of these parts.

Both eyes should have their axes parallel and strabismus

or squint is the condition present when the visual axes of the two eyes are not directed simultaneously on the same object. This defect may be sufficient to cause double vision. The eye directed toward the object is known as the "fixing eye," and the one deviating from the object the "squinting eye."

Involuntary contractions of eyelids to reduce the amount of light entering the eye is known as "blepharospasm," and may be due to a foreign body on the cornea or conjunctiva, disease of cornea or conjunctivitis, ingrowing or misplaced eyelashes, refractive errors, and occasionally disease of the nervous system.

Involuntary lateral movements of the eyeballs (nystagmus) may be caused by a disease of the central nervous system. This is sometimes seen in mental defectives.

The existence of any of the diseases described above can be detected by a trained physician in a few moments' inspection with the light from a window. The patient faces the light and the examiner has his back to the window. After a careful visual inspection, the lower lid is pulled down, using the index finger of the right hand, and the child requested to look up toward the ceiling, which procedure gives a good view of the conjunctiva of the lower lid. Any undue redness or follicular condition on the conjunctiva should be noted, likewise, the presence of purulent secretion from the lacrymal duct.

To inspect the conjunctival surface of the upper lid, it should be everted. To do this the examiner stands in front of the child, takes hold of the margin of the lid and lashes with the thumb and index finger of the left hand, and with a toothpick, match stick or probe in the right hand held against the lid and about parallel to its margin pulls the lid with the left hand away from the ball and quickly rolls it over

the probe. The child is asked to look down toward the floor, and the probe is removed. This will be found a very simple procedure after a little practice. It is painless, harmless, and the only way to observe the condition of the conjunctiva of the upper lid. Trachoma can be readily seen if present. When the examination is finished, gently pull the lid down and request the patient to look up to the ceiling.

Conjunctivitis.—Conjunctivitis is an inflammation of the mucous membrane lining the inner aspects of the lids and the anterior surface of the eyeball. This mucous membrane is continuous with the membrane lining the nose and mouth, and is sympathetically affected by diseases of these cavities, as in coryza. A conjunctivitis is distinguished from an inflammation of the deeper tissues by the bright red vessels of the conjunctiva being easily traced. In inflammation of the deeper tissues there is a bluish or violet red diffuse injection, and the individual vessels do not show distinctly. When making a diagnosis it should be remembered that combinations of these affections often exist.

It is unnecessary for the inspector to intimately acquaint himself with the varieties of conjunctivitis, their pathology and bacteriology.

It is well to remember that the presence of a foreign body, often a mere speck of dust or cinder, may be responsible for an active inflammation. Unless one is accustomed to removing foreign bodies from the eye it is safer to resort to flushing the eye with a solution of boric acid. Grave damage has often been done by inexperienced people fishing and probing in the eye for foreign bodies.

Where an inflammation is due to irritation from a misplaced or ingrown eyelash, the offending lash can readily be pulled out with flat tweezers.

Corneal ulcers may be associated with conjunctivitis

especially if it has existed for some time. If overlooked these ulcers may lead to serious complications and permanent impairment of vision.

All cases of conjunctivitis associated with a mucopurulent discharge should be considered contagious and excluded until under treatment and the discharge arrested. The inspector should not accept the statement of a child that it is receiving treatment, as it may mean the use of home remedies or treatment by a druggist. The child should be required to furnish a certificate from the attending physician.

Where there are repeated attacks of conjunctivitis without an apparent cause, and even though the child shows full vision by test cards, the inspector should insist upon an examination under a mydriatic. These cases often prove to be highly hyperopic.

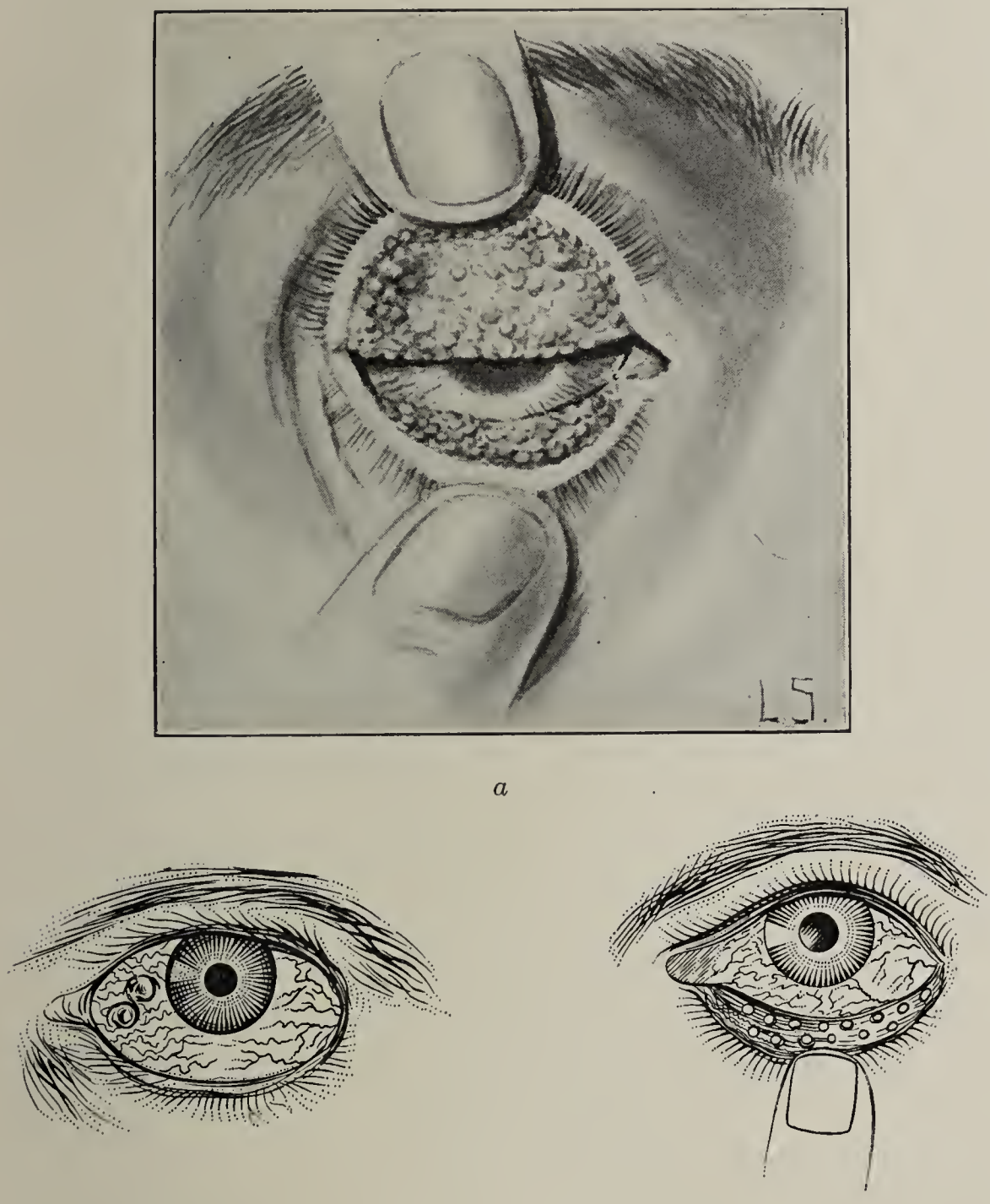
The school physician should acquaint himself with the appearance of three inflammatory diseases of the conjunctiva which occur more or less frequently among school children: (1) phlyctenular conjunctivitis; (2) follicular conjunctivitis; (3) trachoma.

Phlyctenular conjunctivitis is characterized by blebs or vesicles in conjunction with an inflammation of the bulbar conjunctiva. There is redness, irritation, inability to stand light, and a mucopurulent discharge. This form of disease is common among children who are poorly nourished and live under unsanitary conditions. Tonics and fresh air are needed as part of the treatment.

Follicular conjunctivitis is of importance because of its resemblance to trachoma. As the term implies, it is accompanied by the formation of follicles or nodules on the conjunctiva. These nodules are regular in size and appear in rows of small white nodules covered with the glistening conjunctiva. It is seen in both upper and lower lids. This

disease responds readily to treatment, while trachoma is more chronic and resistent.

Fig. 35



a

b *c*

a, trachoma; *b*, phlyctenular conjunctivitis; *c*, follicular conjunctivitis.

Trachoma.—Trachoma is a contagious disease of the conjunctiva associated with a formation of follicles and enlarge-

ment of the papilla, giving a granulated mass sometimes characteristic in appearance. The condition is best recognized deep in the upper retrotarsal fold by everting the upper lid so far as possible. The condition often appeared to the author as though a layer of finely chopped raw beef had been spread upon the conjunctiva.

Reports from most cities show the diagnosis of trachoma to be a difficult problem. Follicular conjunctivitis is most often mistaken for the disease. The inspector need not be discouraged at such mistakes, for even experts on the subject are often in doubt and refuse to make a positive diagnosis except after two or three weeks' treatment. If the case at such time does not clear up, it is supposed to be trachoma. Of course, a bacteriological examination of the trachoma bodies can be made, but few physicians have such laboratory facilities. One may read any number of good descriptions of trachoma and yet fail to recognize a case. Only the practical experience derived from personal observation of a number of cases in the various stages can be of true value to the diagnostician. Pulling down the lower lid and noting a few enlarged follicles is deceiving, because trachoma, as generally found in our public schools, the trachoma bodies are found well up under the upper lid and can be seen only by inverting the lid with a probe or toothpick. The disease may be in an acute stage, with some secretion, or it may be chronic, with cicatricial tissue. The cornea must be examined for any consequent damage to this tissue. All cases of trachoma in an acute or subacute stage with any secretion must be excluded from school, but when there is merely evidence of the remains of the disease, as cicatrization, this is not necessary.

New York City reported in 1909, 45,615 cases of trachoma, of which 1392 were excluded. The inspectors gave to

these cases 310,465 treatments and instructions. They also found almost 50,000 cases of conjunctivitis, of which 1338 were excluded. In 1911 there were reported 15,245 cases

FIG. 36

Inspection of an eye for trachoma.

of trachoma, of which 136 were excluded; 25,941 cases of conjunctivitis, of which 1137 were excluded.

Philadelphia, for the year 1910, reported 45 cases of trachoma among public school children, and 10 cases in the

parochial schools. Four cases were found in institutions and three in young children below school age. In the same year there were reported 558 cases of conjunctivitis. In 1911, of 78 pupils who were sent to the city ophthalmologist, 24 were cases of trachoma; in 1912, of 81 children suspected, 21 were true cases. This may seem to an ordinary observer as a small number, and that possibly many cases were overlooked. The author knows, however, from personal observation, that it accounts for the greater number of cases in the schools. When one stops to consider that trachoma, which is more prevalent in foreign countries, is brought to America by the immigrant, and that the Government holds a strict supervision and examination of all persons admitted to the United States, deporting every case with the slightest suspicions of the disease—one can readily understand why we should not find many cases even in our large seaport towns. The trachoma generally found here are cases which have become quiescent, and after the child has been in the United States for a time, there is an exacerbation, with return of symptoms.

Squint or Strabismus.—The subject of strabismus or squint among school children is of sufficient importance to warrant a small volume on the subject. The physician should know that most of the cases of strabismus are due to ametropia and an early correction by properly adjusted glasses, steadily worn, may mean the straightening of the axes of the eyes. It is in the primary grades where cases of squint should be recognized and treatment urged.

Diseases of the lacrymal glands and passages, the iris and ciliary body, lens and cornea need no absolute diagnosis from the school doctor further than recognition of the existence of some disease of these parts and the recommendation of treatment. Diseases of choroid and retina can only be

diagnosticated by using the ophthalmoscope under proper lighting, and belong within the sphere of the oculist.

Fig. 37

Fig. 38

Cases of squint or strabismus.

Defective Vision.—No physical defect is of more importance with regard to the development of the child and the progress of its education than defective vision. It is one of the most frequent defects noted in inspections of school children. The data on the results of vision tests is extremely variable, due to the ability of the examiners and the lack of uniformity in the methods employed. The reports from various cities show the number of children with defective vision to be from 10 per cent. to 90 per cent. of those examined In a dozen different schools in Boston, examination of the pupils of the five upper grammar grades by the different inspectors gave the number of cases of defective vision varying from 8 to 50 per cent. In the towns and cities of Massachusetts the variation for different schools was 5 to 35 per cent.

In New York City in 1909, 30,408, or 13 per cent. of the children examined, were found to have defective vision. In Chicago there were found 15.9 per cent. and in Philadelphia 10 per cent.

Great difference in percentages of defective vision are due to a variability of what constitutes "defective" and the methods of examination. If testing visual acuity by means of test cards gave an accurate and reliable result showing the exact condition of the eyes, any teacher or even an older pupil could satisfactorily perform the examination. The author does not agree with many of the writers on this subject that the testing of vision can be performed by teachers and others, for reasons which will be explained later.

Defective vision is found everywhere in great numbers, mainly because every city requires an examination by test cards whether authorized by law or by rule. A number of States including Connecticut, Vermont, Colorado, and

Massachusetts have statutes that compel the teachers to examine the eyes of the pupils. The Connecticut law reads:

Section 1. The State Board of Education shall prepare or cause to be prepared suitable test cards and blanks to be used in testing the eyesight of the pupils in public schools, and shall furnish the same with all necessary instruction for their use, free of expense to every school in the State.

Section 2. The superintendent, principal, or teacher in every school, some time during the fall term in each year, shall test the eyesight of all pupils under his charge, according to the instructions furnished as above provided, and shall notify in writing the parent or guardian of every pupil who shall be found to have any defect of vision or disease, and shall make written report of all such cases to the State Board of Education.

The Vermont laws as well as those of Massachusetts are similar to the above, but include an examination of hearing. Several State Departments of Health conduct tests for vision and hearing in the graded schools of incorporated villages of the State. This is so in New York, Pennsylvania, and Utah.

In 552 cities in the United States vision and hearing tests are conducted by teachers, and in 258 cities similar examinations are made by physicians.

Many cases of defective vision in children can be diagnosticated only when a mydriatic is used and by examinations made with instruments of precision, such as the retinoscope and the ophthalmoscope under proper lighting. These cases belong to the oculist, as the schools offer no such facilities. It is important to avail one's self of expert knowledge on diseases of the eyes, as defective vision has a most direct and important bearing on the mentally defective and subnormal

child. The consideration of the subject from such a standpoint will be taken up in the chapter on subnormal pupils.

There have been many reports from various cities classifying the number of cases of hyperopia, myopia, and astigmatism diagnosticated by the school inspectors using test cards. Physicians and laymen speak frequently of the near-sighted pupil. These classifications and expressions are often erroneous, and, to say the least, misleading, because it is almost impossible for a physician to diagnosticate the kind of ametropia except when the child is under a mydriatic and the physician uses instruments of precision, such as retinoscope and ophthalmoscope. Statistics show that the near-sighted child is in the minority, averaging less than 20 per cent. of the defects diagnosticated.

A knowledge of the physiology of the eye and the power of accommodation explains the reasons for the deception in diagnosis by the use of test cards alone. Many children who can readily read the required distance on a test card may prove under a mydriatic, which paralyzes the accommodation, to be an extreme case of defective vision. Under skilled examinations, the hyperopes vary from 75 per cent. to 85 per cent, of the defects found.

In Philadelphia, Dr. Wessels, the ophthalmologist, diagnosticated in 3397 children refracted under a mydriatic, 70 per cent. hyperopic, 12 per cent. myopic, 9 per cent. mixed astigmatism, and 9 per cent. amisometropia.

Test Cards.—The author does not mean to infer that test cards are worthless, as they are the only instruments at our command for use in the school-room, but that they should not be used for a final diagnosis. The fact that a child can see the five-meter line at a distance of five meters, signifies two things, either that the child may have normal vision or may be hyperopic. If this child shows any symptoms

of asthenopia, especially repeated attacks of headaches, an examination under a mydriatic should be advised. If the child before a test card does not get five-fifths vision, it may mean defective vision, which may be hyperopia, myopia, astigmatism, or any of the combinations. The use of the clock dial may assist in diagnosticating astigmatism.

The test cards enable the laymen and physicians to pick out the glaring cases of defective vision, but there is no better means of detecting such cases among school children than the observing and interested teacher, who can tell more by continuous contact and watching the actions of the children than one who stands a child for a few minutes near a test card. A child at this moment may have acute vision, but at the same time while at work in the class-room may show the effects of eye-strain.

Test cards are of various designs. The one most frequently used is that designed by Snellen, consisting of letters or figures accurately measured in dimensions for normal vision at varying distances. Some children, including foreigners who have not learned the alphabet, must be examined by using "illiterate" test cards.

The illiterate card most frequently used for testing the acuity of vision, consists of the letter E with the open spaces and arms pointing in various directions. The dimensions of the figures correspond with the sizes of the letters on a Snellen test card.

The author has devised two test cards which have been successfully used for the very young, the illiterate, and the foreign child, who have not learned the English letters or numbers. One of these cards consists of pictures and silhouettes of well known objects, and the other of hands with a varying number of fingers extended in various directions. In both cards the figures are scientifically measured in size,

FIG. 39

Author's test card for young children and illiterates.

and conform to the scale adopted by Snellen. The card of pictures is especially valuable for children in the lower grades. The hands are particularly adapted for foreign children who do not know the English letters or numbers and cannot tell the English word for a picture or object. With this card the child imitates with his hands what he observes on the card. These pictures of hands also take the place of the astigmatic chart, as in some cases of astigmatism, the number of fingers in a certain direction are frequently mistaken.

FIG. 40

Author's test card for illiterates and foreigners with no knowledge of English.

Use of Test Cards.—The test cards should be placed where they have proper illumination. Daylight from a nearby window or skylight may be used, but artificial light properly reflected on the cards is preferable. Artificial light should be shielded from the eyes of the child by use of a shade or reflector, and the angle of reflection should be such as to avoid a glare on the surface of the cardboard. The height of the card should be such

that the centre is on a line with the head of the child under examination.

It is better not to expose to view more than one card at a time, as it confuses the patient. If several different types of cards are used they can be frequently changed, thus preventing the memorizing of letters or figures. This is important when the examinations must be made in the class-room, as many of the pupils awaiting examination have an opportunity to study a card and memorize the letters. Another way of preventing this, is to require the child to read the letters from right to left.

The child should be seated at a distance of 16 to 20 feet from the card, and each eye should be tested separately by covering the other with a piece of card-board. The child reads the letters aloud, beginning with the top line, which is in largest type. In recording the results of the test, the distance between the card and the child becomes the numerator of the fraction measuring the visual acuity and the smallest type correctly read according to the distance which it should normally have been seen becomes the denominator. These distances are marked after each line on the test card. If a child seated 20 feet from a card correctly reads the letters on the line marked 30 feet, and can read no farther, the visual acuity for the eye under examination is $\frac{20}{30}$. The right eye is generally tested first.

If some of the letters on a line are misquoted, the sign (−) is placed after the fraction ($\frac{20}{30}-$), meaning less than $\frac{20}{30}$ vision.

It is a safe rule never to examine a child who is not under a mydriatic in the presence of its parents. If the child reads the small type, which is often the case in hyperopes, the physician will have great difficulty in convincing the parents that the child has defective vision.

The test with the astigmatic chart or clock dial is made in the same way as with other charts, except that this time the child is requested to tell which lines look the blackest and clearest. If all lines look alike one may infer that no astigmatism exists, but where a particular axis is mentioned it suggests error of refraction in the opposite axis.

The test cards are valuable in some cases as a subjective test, but they make it possible to recognize only the glaring cases of defective vision or those cases in which there is not sufficient accommodation to overcome the defect in visual acuity. The test card does not permit of an accurate classification between hyperopes (far-sighted), myopes (near-sighted) and astigmatism. It is sufficient for the examiner to recognize that a defect exists and leave the diagnosis of variety to the experienced physician or oculist.

Abuse of Test Cards.—The dangers of relying upon test cards for diagnosis is shown in the following incident:

Recently, a principal of a public school published the results of an examination of about five hundred children, using the A B C letter test card and the illiterate E card, and compared the results. His method consisted of placing the child 16 feet from the card; if he saw correctly the letters of the 16 feet line, he was asked to step back 2 feet, and if he still read the letters correctly, he was designated as far-sighted. If he could not see distinctly every letter at 16 feet, he was advanced 2 feet at a time until he accomplished the reading, and these cases were all labeled as myopic or near-sighted. His results recorded were as follows: With A B C card: Near-sighted, 65.8 per cent.; far-sighted, 15.5 per cent. With the illiterate E card he found: Near-sighted, 8.1 per cent.; far-sighted, 82.2 per cent. Having obtained these directly opposite results, he very ingeniously formulated a theory to prove the illiterate E test

card built wrong. It happens, however, that the results he obtained with the illiterate card are nearer to being correct. Myopia in children is rare in comparison to hypermetropia, even if one does hear more about "the near-sighted child." The principal comments as follows: "I frequently found it necessary in all grades, especially in the primary grades, to allow the pupils to rest their eyes. . . Many eyes after reading a half dozen letters were filled with tears. . . It was not an uncommon thing for a pupil to have to move up to 12 feet in order to make out the direction of the E; but having once clearly seen it he could recognize the other directions with apparent ease at twice the distance." There is no desire to ridicule the work of this gentleman, but rather congratulate him on his honesty in publishing such a full and concise report after obtaining such extremely opposite results. His comments spell most plainly *accommodation.* This principal is not the only one who has made the error of trying to tabulate the near- and far-sighted by means of the test cards. The author recently read the report of a physician who examined one thousand school children and used the following method: The pupil was placed five meters from a test card, and a convex spherical lens of a half diopter was placed in front of the eye; if the child said he saw better with this lens than with the naked eye he was registered as hypermetropic. If he saw better with a concave spherical lens of a half diopter he was considered near-sighted, and all others were normal. These statistics are worthless, as a child may easily overcome even a much stronger lens and see distinctly.

Symptoms of Defective Vision.—There are two available methods for the school examiner in recognizing defective vision. (1) Use of test cards; (2) signs and symptoms of eye-strain. The author considers the latter the more reliable

method for an examiner not trained in the use of instruments of precision.

These symptoms may be briefly described as impaired visual acuity, or the power to view objects distinctly at a distance, with complaint on the part of the child; redness or inflammation of the conjunctiva of the lids or eyeballs; repeated existence of styes; squinting of eyes and wrinkling of forehead; headaches on forehead, temples or base of head; nausea, especially when riding in cars; twitching of muscles of forehead or face resembling chorea; holding books nearer or farther from eyes than normal; presence of squint or cross-eyes; various nervous symptoms, even resembling epilepsy in some cases. One or more of these symptoms may be present or obtained from a history of the case. Occasionally no symptom may be complained of, but the child may lack the power of concentration or be deficient in certain branches of study, such as reading or writing. Whenever any signs or symptoms of eye-strain are present, even though the child shows normal vision with test cards, the inspector should insist on an examination under a mydriatic (eye drops) by a competent physician or oculist.

The Need of a Mydriatic.—There are two kinds of errors of refraction: (1) Manifest; (2) latent. The eyes have a power of accommodation, or overcoming errors, most marked among children. This is accomplished by changing the curvature of the cornea and possibly the lens, thus making the rays of light come to a focus on a short or long eye. The errors which persist in spite of this power of accommodation are called "manifest," while those which are overcome by it are called "latent." A mydriatic is a drug which when instilled into the eye prevents the power of accommodation and thus all the error becomes manifest. It is then possible to diagnosticate the true condition of the

eyes and those which before gave full vision may now show half or even less of normal vision.

The belief that the use of drops for such purpose is harmful is erroneous, but because of this belief the physician should always explain to a mother, who entertains such fears, the reason for their use.

The question is frequently asked, "How old should a child be to admit of an examination of the eyes?" Any age after four or five years if the child shows marked symptoms of defective vision.

Strabismus or squint is generally due to defective vision, and the results, especially to straightening the eyes, are more marked if the child is examined while young and necessary correcting glasses prescribed. If the squinting eye is long out of use, it may become a blind eye insofar as vision is concerned.

Children who have been wearing glasses should be watched, and if they come to school without them, should be sent home for them. If the child persists in not wearing the glasses, possibly the glasses are not suited, or the frames are so ill-fitting as to give discomfort. Again, it seems criminal to allow a child to sit in the class-room wearing a pair of glasses so out of adjustment that one lens is on the forehead and the other upon the cheek. An example of such a case is shown in Fig. 41.

When a physician writes a prescription for glasses, and the lenses are supposed to contain cylinders at a certain axis, to correct astigmatism, what results can be expected from the glasses if the patient wears the lenses at any axis? The patient has poor results and the physician receives the blame. Again, the proper fitting of the frames is as necessary as the proper lenses. Unless otherwise ordered for a certain effect, lenses should be so adjusted that the centre of the

lens is at the centre of the pupil. A little attention by teachers to children wearing glasses would result in giving considerable comfort. Frequently a patient returns after a year or so and asks whether they need to change their glasses, because they cannot see as clearly as they did at first, and on adjusting the lenses the fault is easily remedied.

FIG. 41

Glasses need adjusting, a condition to receive attention from teacher.

Many parents pay little attention to their children who have squint, because they believe it to be a congenital condition for which little can be done. It may be well to impress on such parents that a congenital squint is rare. It ofttimes happens, however, that a child inherits defective vision, and through this defect the squint is manifested. When a squint is congenital, there is frequently an accompanying asymmetry of the orbits and possibly of the skull. It is stated by some that the asymmetry of the orbit

admits of the eye turning to adjust itself to the shape of the orbit.

Teachers should aid the physicians in overcoming the opinion that "children should not wear glasses because in that event they must wear them forever."

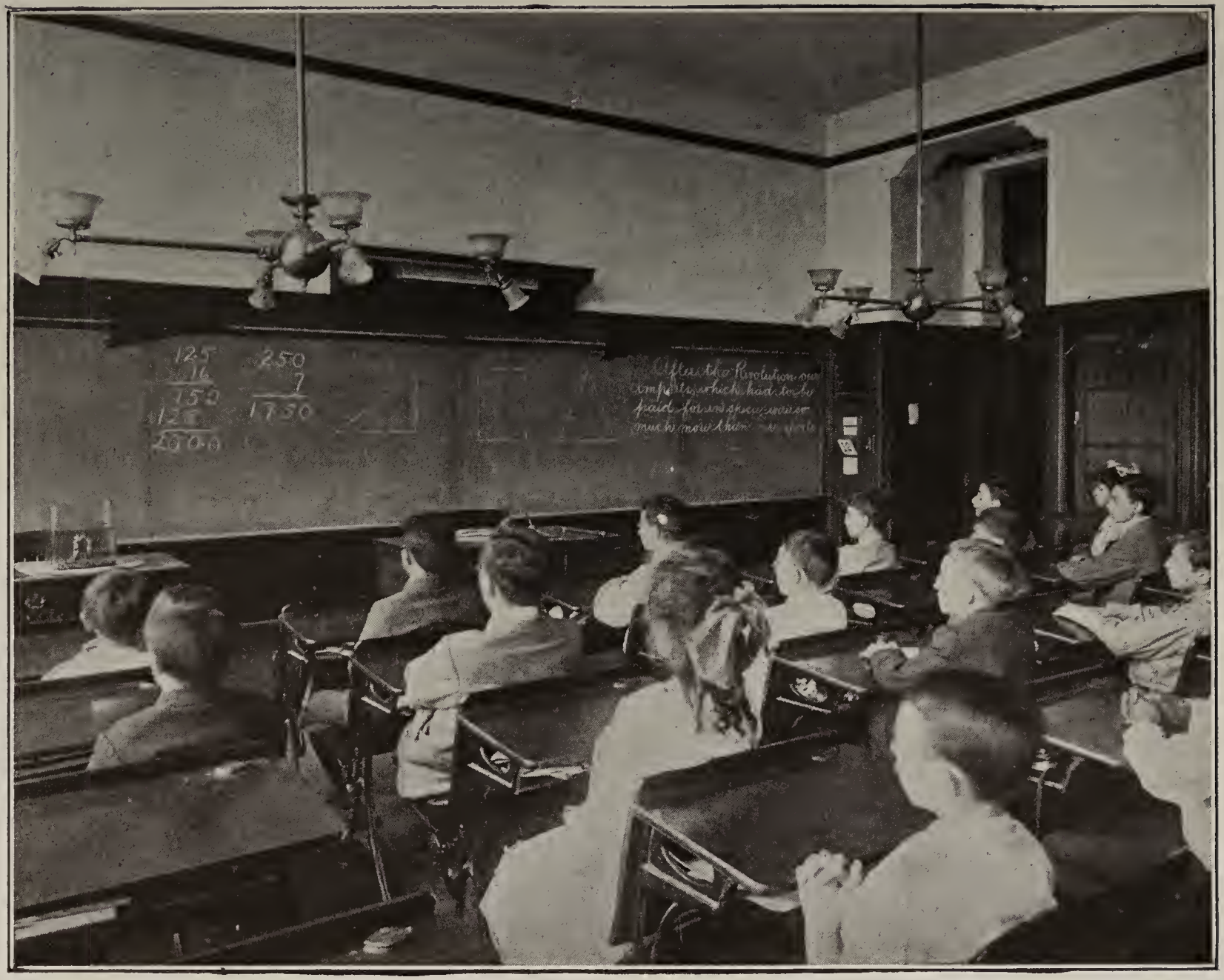
Hygiene of the Eyes.—School hygiene with an object of conservation of the eyes of the pupils should be constantly taught and practised. The child should learn the dangers, and the causes and effects of eye-strain. The class-room admits of various sources of dangerous glare—such as windows, text- and copy-books, maps, walls, and blackboards, and the child should learn how to avoid glare both in and out of school. To avoid glare from a blackboard, it may be tilted at an angle, just enough to reflect to the ceiling the direct rays from the sun, bright sky, or artificial light.

Teachers should regulate the size of writings and drawings on the blackboards and each stroke should exceed the one minute angle as seen from the farthest desk. It may be well to have a sample size of letter and stroke tacked on each blackboard. Teaching script writing by means of a blackboard is detrimental to the vision of the children. A child 40 feet away should have strokes a quarter of an inch wide and letters 6 inches high for normal vision.

Copy-books and text-books should not have glazed paper, letters should be uniformly black, and of a size to be easily read at the ordinary reading distance.

Standards should be adopted for the construction of text-books. The size and kind of type, spacing, width of margins, kind of illustrations, half tones or line drawings, the kind and finish of the paper, are all of extreme importance in the conservation of the eyesight.

PLATE XI



View of Blackboards as They Appear to a Child with Normal Eyes.

THE EARS.

Method of Inspection.—The school medical inspector, not having the equipment nor the proper reflected light needed for a thorough examination of the organs of hearing, may confine his examination to the recognition of defective hearing, and presence of discharges from the ears. The cause and technical diagnosis can be left to the family physician or the specialist.

An inspection should be made in a good light before a window. The following conditions are looked for, the presence of any unusual redness or swelling of the external ear or the surrounding tissue; any purulent discharge from the meatus; or wax and other foreign bodies closing the canal. After observation for any of the above diseases, each ear is tested separately for acuity of hearing.

Method of Testing Hearing.—The hearing may be scientifically tested with an "audiometer," but this instrument has no distinct advantage over the watch or whispered voice. For school examinations the watch or whispered voice is usually employed, while the scientific instruments are used in clinics and laboratories.

Watch Test.—This test is conducted as follows: the examiner stands in front of the child and requests him to close the left ear tightly with his left hand, and also to close his eyes. A watch is then held about 2 feet from and on a line with the right ear. The child is asked if he hears the tick of the watch, and if he answers in the negative the watch is brought slowly closer to the ear until the child claims he hears it. Normally, a watch tick should be heard at $1\frac{1}{2}$ to 2 feet. Results are then recorded—"Right ear, normal" or "Watch at 6 inches," etc. If the watch cannot be heard close to the ear, it should be placed against the mastoid

bone behind the ear. If the tick is heard there and not in front, it signifies trouble with the conducting apparatus.

Fig. 42

Testing hearing with an audiometer

Fig. 43

Watch test for hearing.

PLATE XII

View of Blackboards as They Appear to a Near-sighted Child.

The left ear is tested in a similar manner, with the right ear closed. The examiner should be sure that the watch is in running order before recording results. The closing of the eyes is to prevent guessing, which can be detected by occasionally removing the watch and see if the child still claims to hear the tick. If under these conditions an affirmative answer is given, it is best to resort to the whispered voice test.

Often suspicious cases of defective hearing can be detected as the child enters the room for examination. One simple method, but a good preliminary test, while the child is about 10 feet distant, is to ask in a low tone, "What is your name?" "How old are you?" or similar questions. Where defective hearing exists, and the child has been watching, he either notes the movements of the lips, or hears some sounds imperfectly, and the natural answer is, "What?" "Sir," etc. Suspicious cases should always be confirmed by further examination.

Whispered Voice Text.—The child is placed in a corner of the room away from an open door or window, with his back toward the examiner to prevent his watching the movements of the lips. It is surprising how often a partly deaf child trains itself to interpret what one is saying by watching the lip movements. The child is instructed to repeat every word he hears, and is then requested to close the left ear, tightly with the left hand. The examiner, 20 feet distant, in a clear, distinct, low tone, pronounces words for the child to repeat. If properly interpreted, the ear is recorded "normal." If not heard, the examiner walks toward the child speaking as before until he comes near enough to be distinctly heard. The hearing for the ear under examination is recorded, "whispered voice, 5 feet," or whatever the distance may be. The left ear is similarly tested. The

whispered voice is the most reliable and practical test for school children.

Diseases of the Ear.—Impacted cerumen or wax is recognized in most cases by a causal inspection. This is often a sign of more serious trouble with the ear and should not be passed by as unimportant. These cases should always be referred to a physician or dispensary.

Earache, when complained of by a child, should not be slighted, and as a precaution in home treatment, parents should be discouraged from pouring various hot fluids into an ear without consulting a physician. It is also advisable to warn parents and teachers of the dangers attending slapping the ears of children.

A purulent or mucopurulent discharge from an ear should always be looked upon with suspicion, especially if a child has recently been absent for a week or so. Close questioning may reveal a recent case of scarlet fever, diphtheria, or other infectious disease. It is well when possible to make cultures of such discharges to enable a laboratory diagnosis.

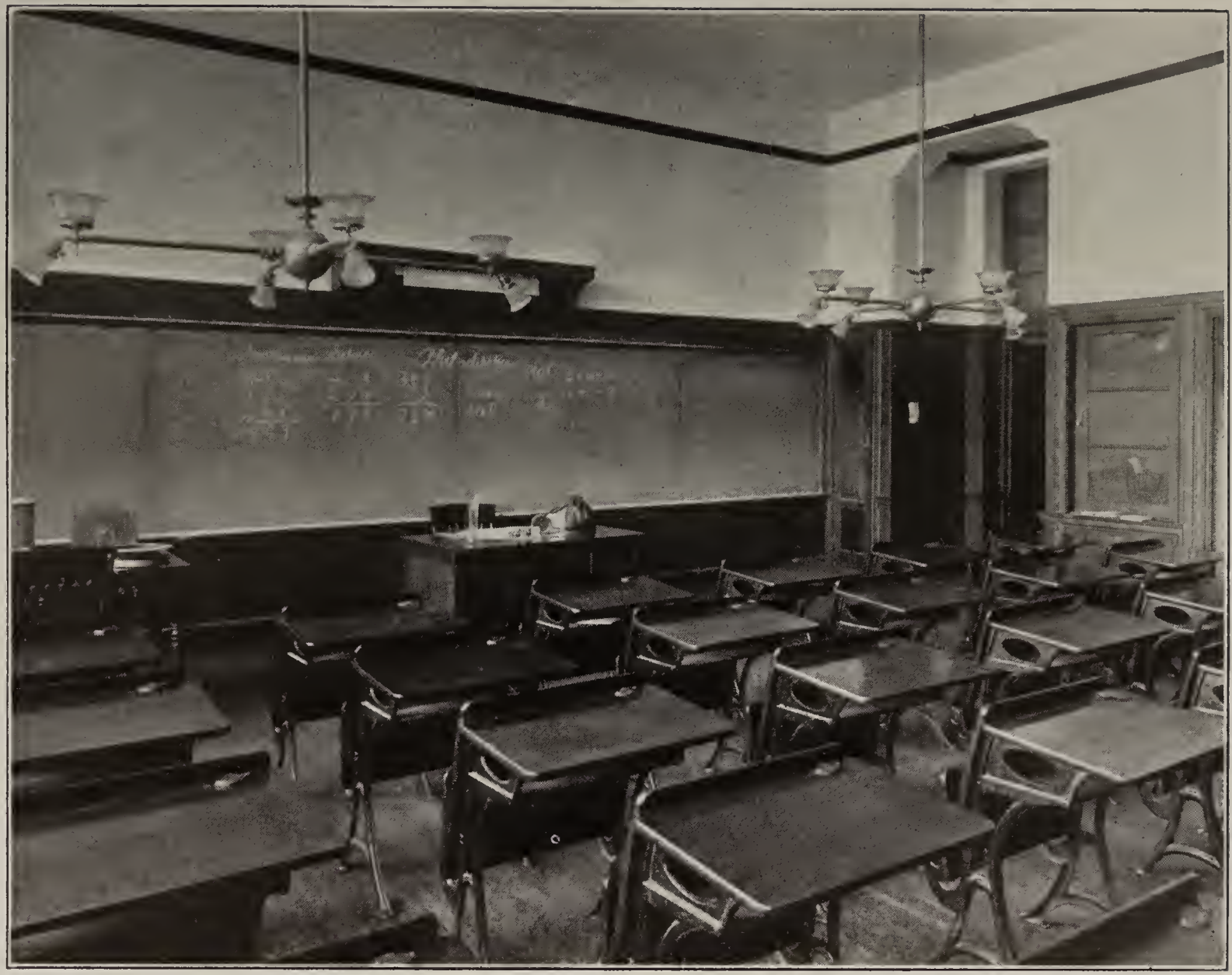
Even should a discharge from an ear prove to be benign, treatment should be insisted upon, as the odor is obnoxious to the classmates and the dangers to the child are numerous.

Defects of hearing and diseases of the ear should require a careful inspection of the nose and throat for causative factors, as there is an intimate relation between these cavities.

NOSE AND THROAT.

The nose and throat are important cavities, requiring careful inspection by the school medical examiner. They may show the first signs and symptoms of an acute infectious disease or they may contain defects which greatly hinder the development of a child. These cavities play an important

PLATE XIII



View of a Class-room as it Appears to a Child with Normal Eyes.

role in breathing and in the faculty of speech. There is not available at the schools proper lighting or instruments for an exhaustive study of these cavities, and because of the hidden location of certain defects, it is impossible to see and accurately diagnosticate them without the needed equipment; nevertheless, careful inspection may aid in detecting some of the common defects and diseases. This is generally so with adenoids, enlarged or diseased turbinates, deflected septum, and growths. The teacher, nurse, and physician may note occlusion of one or both nostrils and mouth breathing, and infer that the child has adenoids. It is better to record "nasal obstruction" and leave the diagnosis of causative factor, whether adenoids, nasal catarrh, deflected septum, or lack of toilette of the nostrils to the attending physician or specialist. Several years ago the author sent fifty pupils who were diagnosticated by teachers and nurses as cases of adenoids, to a nose and throat specialist for reports on diagnosis. Only nine were found to have adenoids, while over one-half had nasal obstruction and mouth breathing from a lack of cleanliness of the nostrils.

A mucopurulent discharge from the nostrils accompanied by watering of the eyes may indicate measles. If a child has been absent for several days and returns with a nasal discharge, eliminate diphtheria and scarlet fever. Coryza, bronchitis, and hay fever have nasal discharge as a prominent symptom. If a child has a chronic, fetid discharge an atrophic rhinitis may exist, possibly accompanied by a growth.

Foreign bodies, pencils, rubbers, and various other small articles are occasionally pushed into the nostrils. These can frequently be extracted with small tweezers. In the absence of tweezers, a hair-pin, with its ends bent to make a broader grasping surface, may answer the purpose.

Nosebleed is frequent in children, due to injury, catarrhal conditions, plethora, and more rarely cardiac or pulmonary affections. It may be controlled by applying ice to the base of the nose or nape of the neck, with the child in the recumbent position. A weak solution of tannic acid on a pledget of gauze inserted into the nostrils or an application of adrenalin solution may be reguired.

Technique of Examination.—To examine the mouth, teeth, palate, tonsils, and pharynx, the child should be requested to open the mouth, but not to stick out the tongue. Then the examiner can observe the condition of teeth, tongue, and mucous membrane of that cavity. Ulcers or an inflammation (stomatitis) of the mucous membrane may be present. Foul breath may indicate carious teeth or want of cleanliness of the mouth, and a coated tongue may reflect gastro-intestinal derangement. The child should then be requested to protrude the tongue and say "Ah" (as in father). With a wooden tongue depressor on the tongue not too far back, the examiner can obtain a good view of the tonsils, uvula, and pharynx.

The shape and condition of the vault of the mouth, size of uvula, presence of cleft palate, size and condition of tonsils and pharynx, and the presence of any foreign growths, like adenoids in upper part of pharynx, all should be noted. Also any unusual redness of the tonsils or uvula, and presence of any exudate, membrane, or follicular plugs should be carefully looked for, keeping in mind the possibility of scarlet fever and diphtheria.

A suppurative tonsillitis or quinsy may push a red, swollen tonsil forward. Plugs of exudate in the follicles of the tonsils suggest a follicular tonsillitis. Deep ulcers upon the tonsils with surrounding tissue normal is suggestive of syphilis. All membranes, exudate on tonsils, pharynx,

PLATE XIV

View of a Class-room as it Appears to a Child Suffering from Astigmatism.

or adjoining tissues, should be cultured for diphtheria germs.

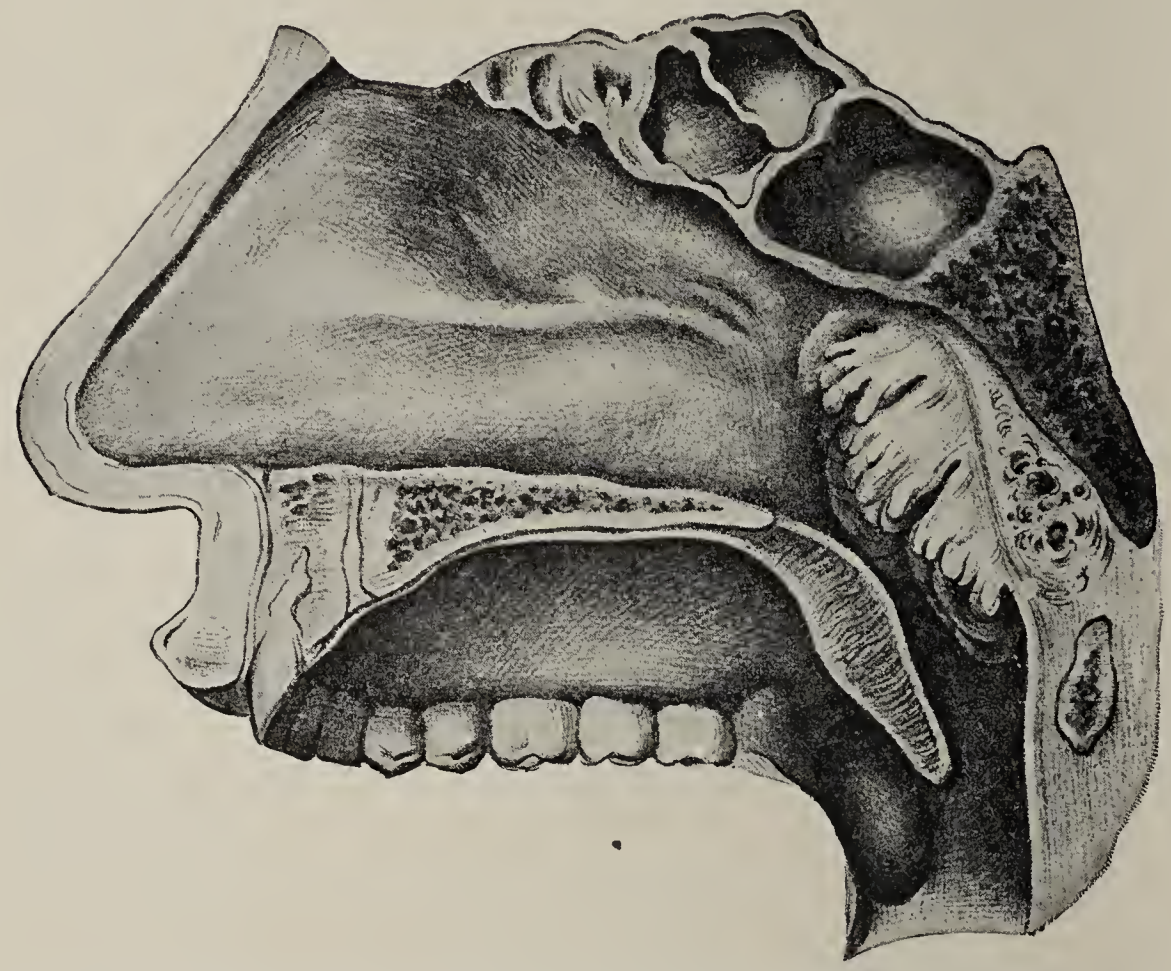
The Voice.—The voice may often give valuable diagnostic signs. Whispered low sounds or harsh coarse voice may indicate an acute laryngitis, tonsillitis, or diphtheria. If subacute or chronic, it may be due to post-diphtheritic paralysis or habit tones. Mouth speech with absence of nasal sounds accompanied by mouth breathing indicates an obstruction in the nasopharynx or nostrils.

Enlarged Tonsils.—Excepting adenoids, no other defect is more discussed in the examination of school children than enlarged or hypertrophied tonsils. Various cities report from 5 per cent. to 85 per cent. of the school population as suffering from this defect. This wide variation is due to the lack of a uniform standard of what constitutes an enlarged tonsil. Enlarged tonsils should mean only those defects in which the tonsils are large enough to give signs and symptoms of obstruction to the upper air passages. One must consider the relative size of the throat in comparison to the size of the tonsils. A ragged, diseased tonsil though comparatively small is more dangerous to the health of a child than an enlarged smooth tonsil giving no symptoms. The promiscuous removal of such tonsils, which seem a trifle larger than what we think they should be, is not to be encouraged. "Hypertrophied tonsils" should only be recorded on the physical record card of a child, when such a diagnosis has been made by a physician or specialist in diseases of the nose and throat.

Adenoids.—In some cities a medical inspector who has not diagnosticated a great number of cases of adenoids among his pupils is considered negligent in his duties, while in reality he is conscientious and worthy of commendation. Mouth breathing is not always evidence of the presence of

adenoids, and a mere glance in the throat rarely shows these growths. The specialist never makes a diagnosis of this defect until he has passed a small mirror to the back of the throat and sees the growths reflected there, or has passed a finger back in the pharyngeal cavity and felt the irregular

FIG. 44



Antero-posterior section of the head, showing location of adenoids and difficulty of diagnosticating by simple inspection.

masses. Therefore, although it is well to be suspicious of adenoids, the case should not be labeled as such until the growths are seen or felt.

When adenoids and hypertrophied tonsils are present in a child, they may not only give acute and alarming symptoms, but may have a permanent effect on the child's health. Some of the effects produced are:

1. Danger of obstruction to breathing and improper aëration of the lungs, which may influence the health and mental development of the child.

2. Changes in expression and contour of the face.

3. Defective speech.

4. Dangers of ear complications, inflammation, otorrhea, and defective hearing.

FIG. 45

Usual expression of a boy with adenoids.

5. Increased liability to infectious diseases, especially diphtheria and scarlet fever.

6. Frequent attacks of colds and nasal catarrh.

Hypertrophied tonsils and adenoids have a tendency to become smaller during early adolescence and sometimes disappear in adult life. This, however, is no argument for

non-treatment of these defects as the above cited dangers are always present. In some cases the so-called disappearance of adenoids or enlarged tonsils as the child grows older is only a relative diminution in size. Here the growth remains stationary while the cavity of the pharynx and throat enlarges with the development of the child.

Speech.—Normal speech is a clear, distinct, and audible pronunciation of sounds, letters, and words. It is dependent upon the normal condition of the nerve centres, larynx, pharynx, nostrils, vault of the mouth, tongue, teeth, and lips. The sense of hearing influences the sense of speech. Abnormality of any of these organs may be expected to cause defects of speech.

To test speech, the child should be required to pronounce certain letters, and words containing combinations of these letters. The letters most frequently mispronounced are: b, m, n, f, p, v, w, o and u; also the dentilinguals d, t, th, l, n, r and s.

The defects of speech found among school children include:

1. Aphasias.
2. Tremulous, interrupted speech.
3. Hesitating speech.
4. Inability to pronounce certain letters.
5. Stuttering.

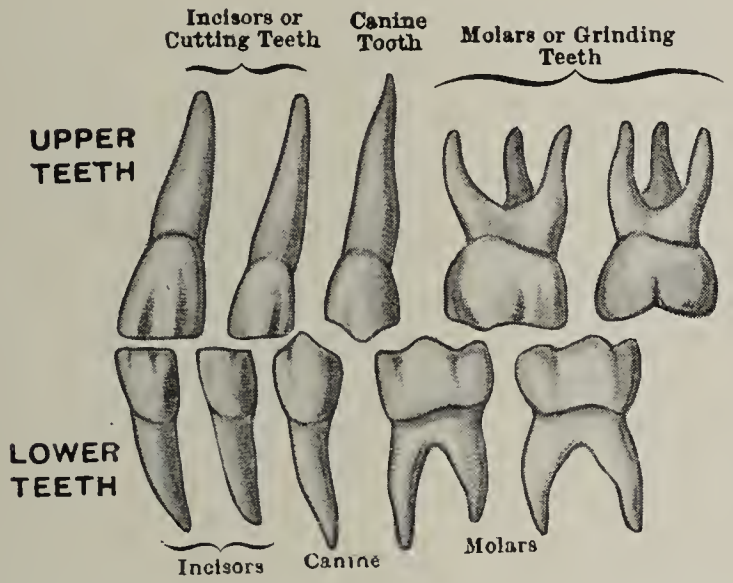
One or more of these defects are generally found among mentally defective children.

Malformations of the oral cavity are chiefly those due to irregular teeth or shallow and small arches forming the palates. In the lower grades there is occasionally found a case of cleft palate or cleft lips. Any of these malformations may seriously interfere with speech.

THE TEETH.

There can be no doubt as to the value of sound, normal teeth to the health and comfort of a child. The teeth reflect the general health as well as an attempt at healthy living. Foul, unclean, and decayed teeth reflect a carelessness, want of cleanliness, and a disregard of the rules for personal hygiene. The school inspector can readily recognize decay in teeth, if on the anterior surface or grinding edges of the

FIG. 46



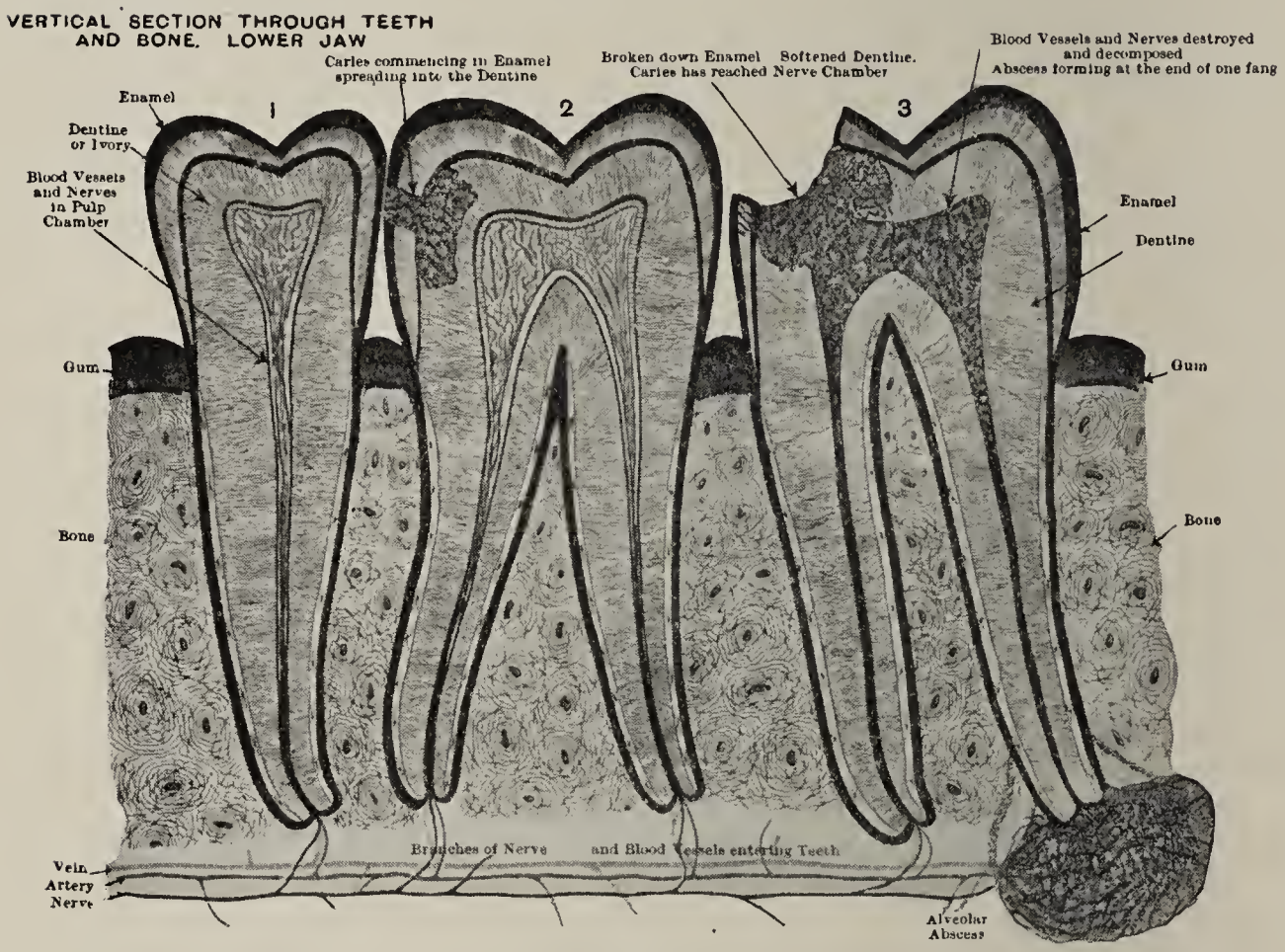
Side view of upper and lower temporary teeth of the left side. These begin to appear at six months and are complete at two and one-half years.

front teeth, but the primary trouble, which is the more important, is more often hidden along the alveolar borders, between teeth or on the back molars. Again, the age of school children includes the periods from six to ten years, which is the transitional period between the going of the temporary teeth and the coming of the permanent ones. If the school children of a city were carefully examined by dentists, 95 per cent. would be found with decayed teeth.

For the above reasons, teachers, nurses, and medical

inspectors should devote time to teaching the children the hygiene and care of the teeth, the use of a tooth-brush, tooth-powder, and oral cleanliness. Examination of the teeth and necessary treatment should be left to dentists. Where a city cannot afford to have a paid corps and a dental clinic, volunteers can undoubtedly be obtained.

FIG. 47

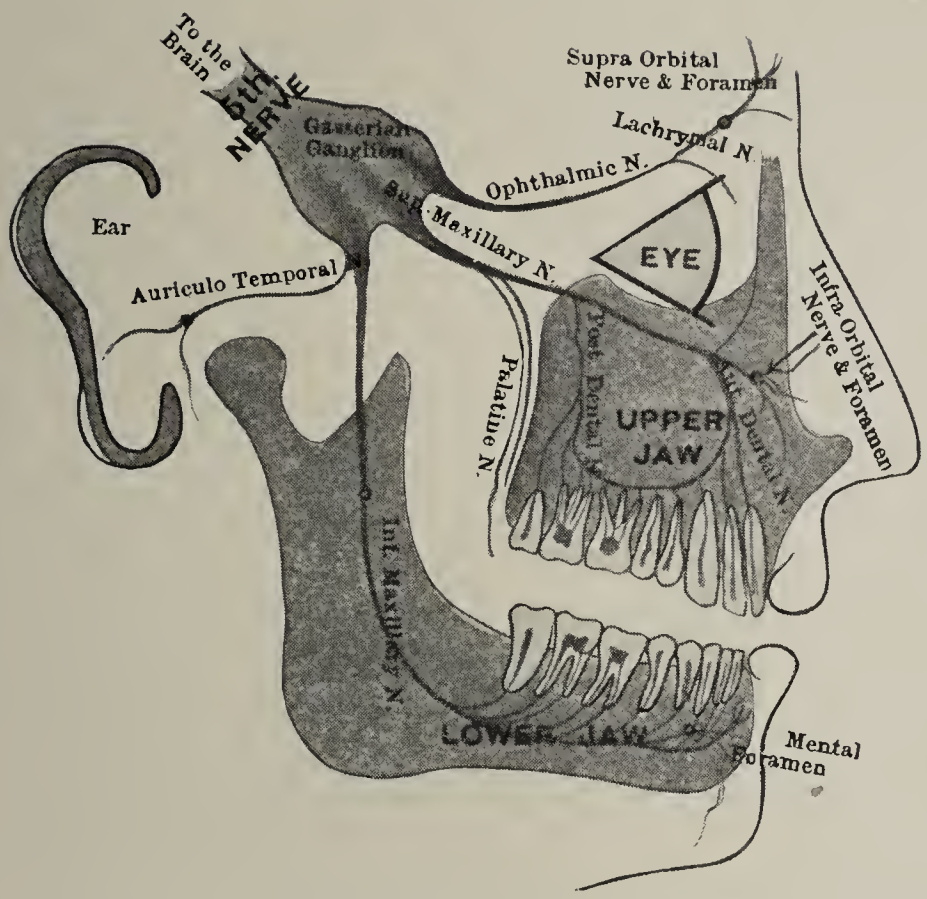


Dental caries.

Dental Clinics.—While in a number of cities some dental work is performed among the school children, but four cities have dental school clinics.

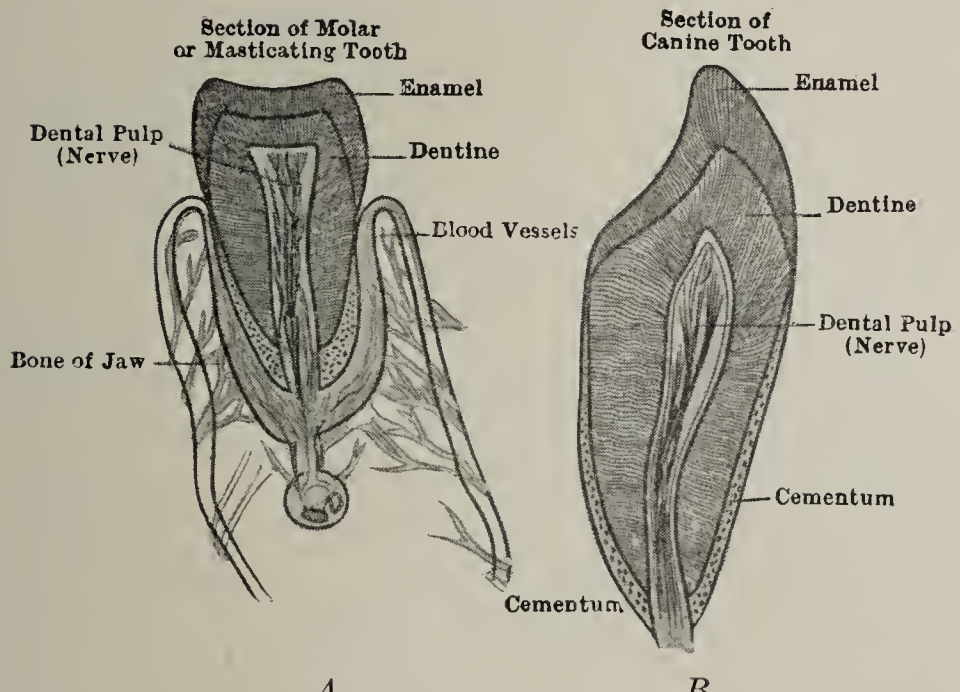
In Philadelphia a dental dispensary was organized October 5, 1910, with two hundred and ten volunteer dentists. The

FIG. 48



Dental nerves.

FIG. 49



A *B*

A, structure of a permanent grinding or molar tooth; *B*, structure of a front incisor or cutting tooth.

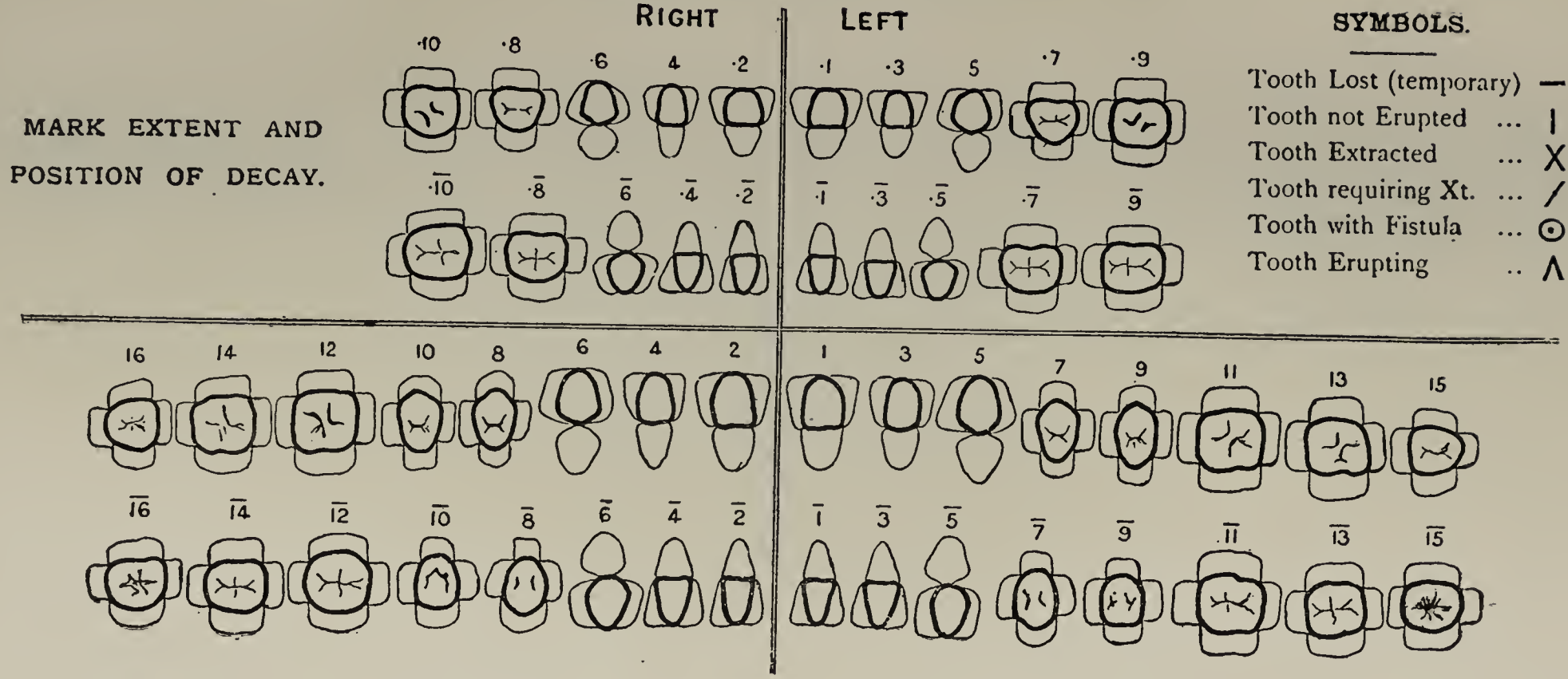
work was so successful that the following year money was appropriated to pay three dentists seven hundred dollars each per year. The central clinic at City Hall was supplemented in 1912 by a downtown school clinic.

In 1910 the equipment of the Dental Dispensary and the organization of the volunteer corps of operators and inspectors were advanced to the point where the treatment of the teeth of school children could be begun. In the dispensary in City Hall there were two chairs in service, and by the end of the year, the equipment was completed by providing a third chair for administering nitrous oxide gas in such cases as required unavoidable extraction. One afternoon of each week was assigned for extractions, and on all other days the third chair was used for operations involving means of preserving teeth, which is the primary object of the dispensary.

The equipment is modern and complete. Especial attention was given by the committee to devising forms and records with provisions for securing uniform procedure on the part of the numerous dentists who volunteered for the work.

The examination chart on pages 211 and 212 shows a specimen of the chart used and the methods of recording conditions found upon inspection of the teeth. These examination charts and also the clinical charts are printed on five by eight card-board in red ink to permit the legibility of black pencil marking.

Specimen Examination Chart.


RIGHT
LEFT
MARK EXTENT AND POSITION OF DECAY.
SYMBOLS.
Tooth Lost (temporary) —
Tooth not Erupted ... |
Tooth Extracted ... X
Tooth requiring Xt. ... /
Tooth with Fistula ... ⊙
Tooth Erupting .. ∧
·10 ·8 ·6 4 ·2 ·1 ·3 5 ·7 ·9
·10 ·8 6 ·4 ·2 ·1 ·3 ·5 ·7 9
16 14 12 10 8 6 4 2 1 3 5 7 9 11 13 15
16 14 12 10 8 6 4 2 1 3 5 7 9 11 13 15

(v) CHECK ANY OF THE FOLLOWING CONDITIONS FOUND

STATE OF TEETH	TARTAR		No.	
Clean	Little	Natural arrest of Caries		Cleft Palate
Fair	Much	Fractured Teeth		Hard | | Soft
Dirty	TOOTH BRUSH	Fistulæ	2	Mouth Breather
Foul	Used	Fistula opening on Face		Much Caries | | Little Caries
Stained	Not used	Supernumerary	2	Enlarged Tonsils
IRREGULAR	Has none	Hutchinsonian Teeth		Necrosis of Bone
Upper		Honeycombed		Cicatricial Attachments
Lower		Teeth Filled		Closure of Jaws

OPERATOR	
OPERATION	
DATE	
OPERATOR	
OPERATION	
DATE	
OPERATOR	
OPERATION	
DATE	

Special Instructions.—The charts shall be marked in *pencil* in order to avoid the accidental marks from blots if marked in ink.

The essential points required shall be supplied by marking on the chart of the teeth the extent and position of the decay, the teeth lost, not erupted, extracted, or requiring extraction, and those accompanied by fistulas. Special care shall be taken that the number of teeth actually present is accurately shown on the chart, as otherwise errors may arise as to the frequency of the presence of temporary teeth in the adult.

Enter age of child examined, in years and months, on date of examination. If the age is doubtful, place an interrogation mark after the figure on the reputed age. Carefully ascertain the general information called for and note the following instructions for marking the examination chart:

Temporary Teeth. 1. Shade in roughly on each tooth diagram the extent of the caries affecting each tooth. (See specimen case 7, 8, 9, etc.)

2. Teeth lost should be indicated by a horizontal line drawn across the diagram thus:——(See specimen case ·2, ·4, ·1, ·3, etc.).

Permanent Teeth. 1. Teeth not yet erupted should be indicated by a vertical line drawn through the diagram of such teeth, thus: **I.** (See specimen case 6, 8, 10, etc.)

2. Teeth which have been extracted should be indicated by a St. Andrew's cross, thus: **X.** (See specimen case 11.)

3. Teeth which should be extracted should be indicated by an oblique line, representing one limb of the cross thus: **/** (See specimen case $\overline{11}$.)

4. Shade in roughly on each tooth diagram the caries affecting each tooth.

5. Any fillings present may be indicated by a simple outline on the appropriate tooth diagram. (See specimen case 12.).

6. Note on the chart, over or under the appropriate tooth diagram, any existing fistulous opening, thus: ⊙. (See specimen cases $\cdot\overline{8}$ and $\overline{11}$).

If, upon investigation, the case is found to be a proper one for dispensary treatment, the following certificate is used and the necessary treatment is given:

CITY OF PHILADELPHIA.

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES.

BUREAU OF HEALTH.

DENTAL DISPENSARY,
Room 706, City Hall.

Philadelphia.....191.....

This is To Certify that.....age.....
Residence ..... School.....
District..... Grade.....
is in need of dental treatment and the parents are unable to pay for the same.

.....

Inspector.

.....

Principal.

Present this Certificate at Room 706, City Hall.
Office Hours: Monday to Friday, 9 A.M. to 4 P.M.
Saturday, 9 A.M. to 12 noon.

Engagements with a child at the clinic are recorded on one of the following blanks, which is to be shown to the teacher and brought back to the clinic at appointed time:

CITY OF PHILADELPHIA, DEPARTMENT OF PUBLIC HEALTH AND CHARITIES. BUREAU OF HEALTH.

Dental Dispensary: Room 706, City Hall. Branch: Southwark School, 9th and Mifflin Streets.

.....

Has an Appointment for — Attest When present

Monday .....at.....
Tuesday.....at.....
Wednesday .....at.....
Thursday.....at.....
Friday .....at.....
Saturday .....at.....

BRING THIS CARD WITH YOU.

Discharged.....for.....Months

Show this card to the teacher.

DIRECTION FOR BRUSHING THE TEETH.

Turn out about a teaspoonful of precipitated chalk into the palm of one hand, touch the chalk with the wet brush, and brush (1) up and down the inside of the lower front teeth, (2) the right and (3) the left side of the lower back teeth, (4) inside of the upper front teeth, (5) right and (6) left side of the upper back teeth, (7) outside of all teeth, upper and lower, brushing up and down.

To clean each of these seven divisions, first wet the brush then dip it in the powder in the hand.

Brush the teeth at night and rinse the mouth night and morning with a teaspoonful of table salt dissolved in a tumbler of warm water.

Reports of the work performed each day are kept on blank forms similar to the one here reproduced, and weekly and monthly reports rendered to the chief of the bureau.

BUREAU OF HEALTH—DENTAL DISPENSARY

Dr. ---------- Absent

Week Beginning ---------- SATURDAY | MONDAY

Examinations	
Fillings — Amalgam	
Fillings — Gutta-percha	
Fillings — Cement	
Fillings — Cu. Cement	
Pulps — Capped	
Pulps — Devitalized	
Pulps — Extracted	
Canals — Dressed	
Canals — Filled	
Ground, $AgNo_3$	
Pulpitis	
Pericementitis	
Al-Abscess	
Stomatitis	
Extractions	
Gas Administered	
Cleansing	
Discharged	
Miscellaneous	

NUMBER OF PATIENTS FOR WEEK ------

Eruption of Teeth.—The table below gives the approximate time for the teeth of the two sets to erupt, but in individual cases they may come in earlier or later than the dates given, as these dates are only an average.

DECIDUOUS OR BABY TEETH.

Tooth.	Erupts.	Is Shed.
Central incisors	6th to 8th month	About the 7th year
Lateral incisors	7th to 9th month	About the 8th year
Cuspids	17th to 18th month	About the 12th year
First molars	14th to 15th month	About the 10th year
Second molars	18th to 24th month	11th to 12th year

PERMANENT TEETH.

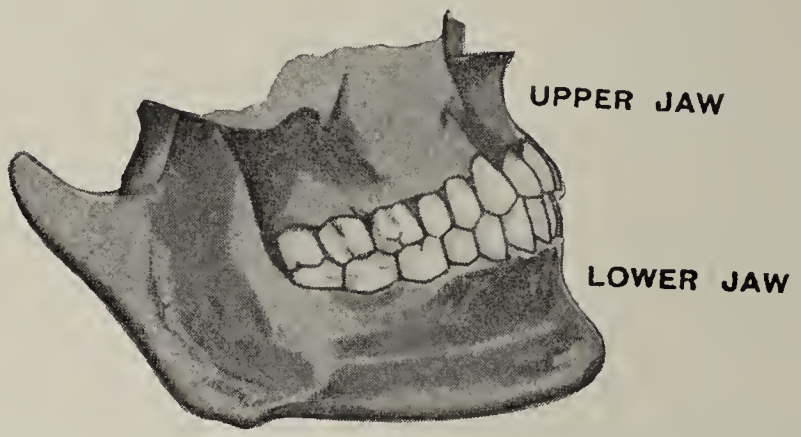
Tooth.	Erupts.
Central incisors	7th to 8th year
Lateral incisors	7th to 8th year
Cuspids	12th to 13th year
First bicuspids	10th to 11th year
Second bicuspids	11th to 12th year
First molars	6th to 7th year
Second molars	12th to 14th year
Third molars	17th to 26th year

The first permanent tooth to erupt is the first molar, which is the sixth tooth from the middle line of the face and makes its appearance when the child is about six years of age. As this tooth is being formed in the jaw from the time the child is born, some of the diseases of children, such as scarlet fever or measles, may result in its being faulty in formation. In any event, it comes into the mouth at such an early age that parents should give it particular attention. This is especially necessary, as it is probably the most important tooth in the mouth so far as the future health of the child is concerned.

Shape.—If the permanent upper incisors are somewhat rounded and peg-like, tapering from the gums, with a dis-

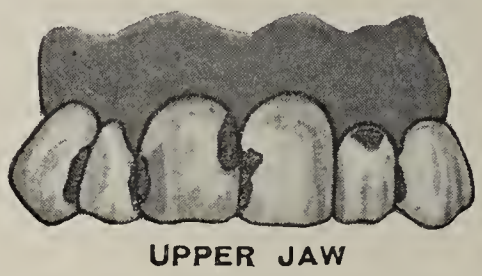
colored notch on the edge, they suggest syphilis. Keratitis and middle-ear disease associated with such teeth confirm such a diagnosis.

FIG. 50



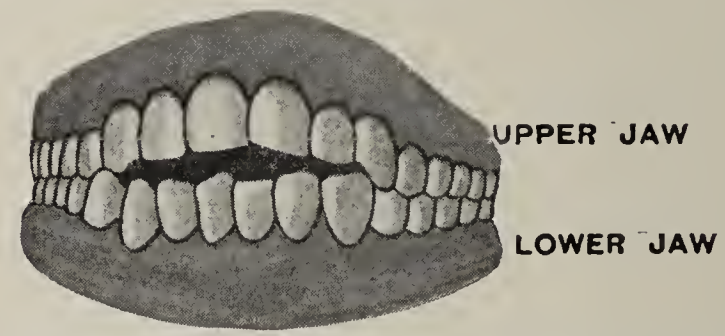
Ordinary healthy second set of teeth, showing how the lower fit into the upper teeth.

FIG. 51



Showing front teeth and places between teeth where food has collected and led to decay.

FIG. 52



Front view of the upper and second lower teeth, showing how the teeth do not meet in front as the result of thumb-sucking, the use of rubber teat, or comforter.

Loosening of the teeth, associated with spongy, bleeding gums, may be caused by lack of proper hygiene of the mouth,

a mercurial stomatitis, pyorrhea alveolaris, possibly rheumatic, or it may be caused by scurvy or purpura.

Stomatitis, inflammation of the oral cavity, with or without carious teeth, is generally due to lack of proper hygiene

FIG. 53

Side view of second set of upper and lower teeth, showing how the front upper teeth may project, as the result of thumb-sucking, the use of the rubber teat, or comforter.

FIG. 54

Showing natural crevices in healthy back teeth in which food collects and so leads to decay and formation of cavities. A bicuspid has at some time been extracted on the right side and nature has filled the gap.

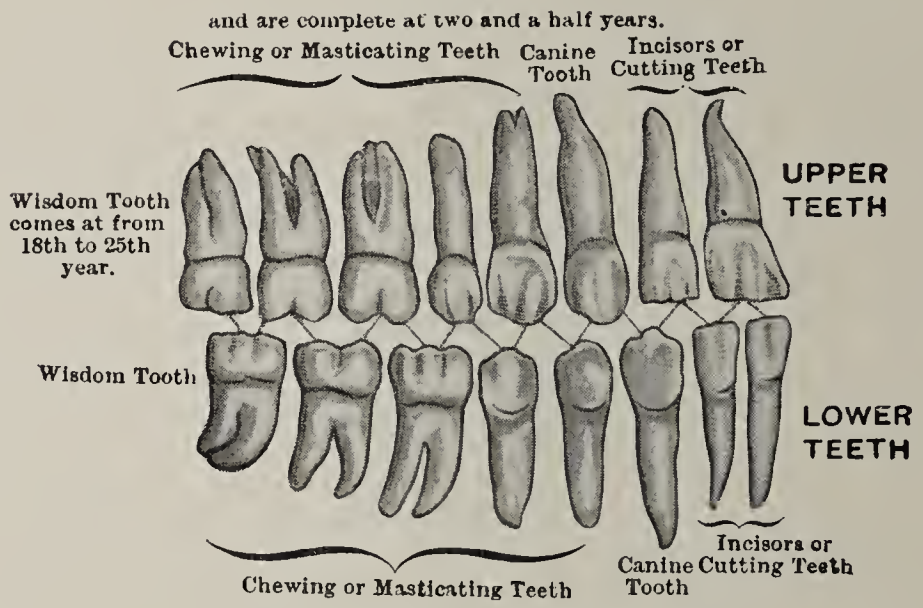
of the mouth. This may vary from a simple redness with a few small ulcers to a gangrenous state of the mucous membrane.

The teeth are supposed to have their cutting edges meet the similar surfaces of the teeth in the other jaw, when the jaws are closed. There should be no large spaces between adjoining teeth. Irregular teeth not only mar the appear-

ance of the individual, but the deformity detracts from their usefulness. Chewing may be interfered with and speech affected. There is also an increased liability to decay.

Irregular teeth are caused by heredity, certain habits in childhood, such as sucking the thumb or comforters; diseases or growths in the nasopharynx, which may alter the shape of the mouth; and too early loss of temporary teeth by neglect and extraction. Each of the deciduous or temporary teeth is succeeded by a permanent tooth,

FIG. 55


and are complete at two and a half years.
Chewing or Masticating Teeth
Canine Tooth
Incisors or Cutting Teeth
Wisdom Tooth comes at from 18th to 25th year.
UPPER TEETH
Wisdom Tooth
LOWER TEETH
Incisors or Cutting Teeth
Canine Tooth
Chewing or Masticating Teeth

Side view of upper and lower permanent teeth of right side. They begin to appear at six years of age and are complete at twelve, with the exception of the wisdom teeth which appear at from sixteen to twenty-five years of age.

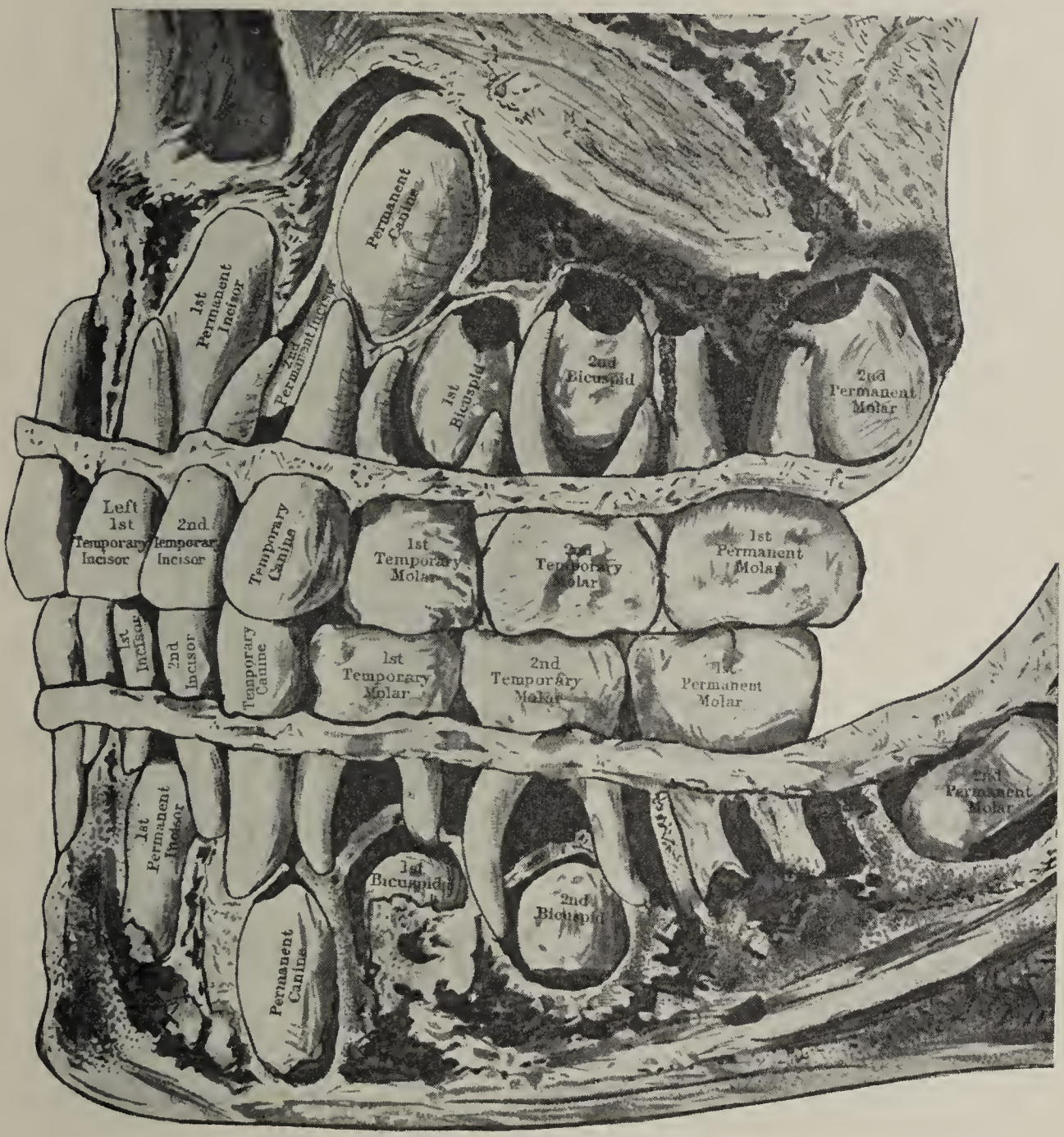
and their relation in the jaw makes it necessary for the temporary tooth to remain until the permanent one is about to erupt.

Decay, or carious teeth, is due to neglect. When the signs and symptoms of decay are ignored, the pulp becomes involved, the tooth is destroyed, and infection may take place, attended by acute pain and swelling of the face, due to an abscess formation.

A warning should be given where an abscess has formed

from a decayed tooth, not to poultice or apply heat to the face, as the abscess may rupture on the face and leave an

FIG. 56



Teeth of a child between six and seven years old. Bone removed to show second set forming.

unsightly scar after healing. Warm solutions in the mouth are more comforting, and if the pus comes to the surface, will cause it to discharge on the mucous surface.

THE TREATMENT OF CHILDREN'S TEETH.[1]

In any community where dental organizations exist available for public service, it would be a wise plan to first examine all the children subject to prospective treatment for the purpose of filling the first permanent molars before the pulps become involved.

When it is considered that at this age, with partially calcified roots, the permanent usefulness of these teeth depends on a live pulp, and when the preservation of this organ vital or its exposure may rest on the narrow margin of a few days, the demand for action is apparent; that it may be saved for life, before exposure, by one or more simple operations requiring a few minutes' time as against an operation after exposure requiring superior skill, several hours' labor, and less promising results.

We may be justified in trusting to nature to overcome the possible consequences to the permanent teeth from the premature loss of the temporary ones, but there is no remedy for the results attending decayed and neglected first permanent molars.

The choice of filling material for simple cavities in these teeth is no problem. Pink gutta-percha base plate serves every purpose; even though it be less durable than amalgam, its superior insulating property permits the pulp uninjured by thermal shock to continue its formative function. Furthermore, if decay exist at all at this age, it indicates a period of susceptibility due to a contributory constitutional cause, and this material offers the best protection during this time.

[1] By P. B. McCullough, D.D.S., Philadelphia, chairman of the committee in charge of the Dental Dispensary, Department of Public Health and Charities.

When the filling has worn to such an extent as to require a new one, choice of material should be governed by the prevalence or absence of susceptibility to decay. If the former state obtains, it is well to repeat the gutta-percha; if the latter, amalgam may be substituted. In every case, phenol should be the last application preceding the filling.

In cases of extensive decalcification of the permanent molars without pulp involvement, copper cement or zinc-phosphate is to be preferred. For fear of operative exposure all decalcified dentin need not be excavated; alternative is to be had in germicidal agents. Extreme care is required to preserve the pulps in these teeth alive, the permanency of the filling being a lesser consideration.

As one internal administration of a drug will not cure a disease for which it might be specific, so does repeated filling help a sick tooth.

After the cavity has been prepared, observing the limitations stated, it is saturated with phenol, dried, then silver nitrate, then the cement.

Capping of an exposed pulp can, at best, be regarded as a tentative procedure. All that can be expected of the material is that it be non-irritating, germicidal, with some lasting antiseptic property, and have body. Such a combination we have in a paste of phenol, iodoform, and zinc oxide. Cement is the best filling over this cap, because its durability is limited and, when refilling is indicated, opportunity is given to see the result of the treatment.

Whether this capping material or any other of the known combinations is used, there is one of three possible results: First, if the extent of pulp infection is such that it is not sterilized by the treatment, pain within a few days following the operation will require the removal of the filling and justify devitalization. Second, if structural change of the

pulp has been such from the exposure that repair does not follow, then the pulp slowly dies, without pain, and, as a rule, without suppuration within the life of a cement filling. Third, rarely the pulp may and has continued vital under this treatment, sealing the exposure with calcific deposit.

Arsenic, a most valuable agent, need not be used to devitalize pulps in young teeth. The secret of pulp extirpation withoug pain consists in understanding the time required to produce desensitization. To this end, cotton wet with phenol, touched to iodoform and sealed on the exposure with temporary stopping to stay a few days or a few weeks, will be found effective.

Extension of the cavity, for direct access to canals, is necessary to thoroughness, and a reamer used to enlarge the mouths of the latter only. The use of any other engine tool is unnecessary and unmechanical. With smooth broaches and sodium-potassium results are obtained heretofore impossible.

The distal canal of the lower and the palatal canal of the upper molars are best filled with pink gutta-percha base plate. Out of regard for accuracy, a set of canal pluggers has been designed of graduated sizes so that, when a large foramen presents, it may be sealed with precision. Beginning with a small plugger, successive sizes are tried until one is reached that will not pass the opening, then the next size larger is selected to place the gutta-percha seal.

The distance from the end of the plugger, when in place, to the foramen is measured, and a point rolled of such length and uniform diameter, the plugger heated and touched to the point, the canal flooded with alcohol, dried (not desiccated), then moistened with phenol, which allows the softened gutta-percha to slide along the walls of the canal without bending. When cajuput or eucalyptol is

used, it is better to place the drug in the canal rather than dip the point in the solvent.

Oxychloride of zinc, when properly made, is a superior filling for the mesial canals of lower and the buccal canals of upper molars. It can be pumped to place with smooth broaches, and pressed with cotton pledgets without danger of forcing it through these canals, when normal. A drop of glycerin at the time of mixing retards setting.

For the treatment of infected root canals formaldehyde is the most potent germicide, but, as such, it requires judicious handling. A paste made of three grains each of iodoform and precipitated chalk, with water and alcohol and one drop of formalin, is as strong as this gas can be used not to cause peridental irritation. This mixture can be readily pumped into canals where it would be difficult to place cotton threads.

The object of the combination is primarily to provide convenient distribution of the formalin, the iodoform as a more lasting antiseptic and the chalk as a convenient vehicle.

Odontalgia.—With time, skill, and care, it may be said, as general statements go, that every operation we are called upon to perform for children can be done without pain, except extracting, and, correlatively, it is equally true that it is never necessary to extract to relieve toothache.

The first step in a contemplated remedy is diagnosis; an intelligent attempt to relieve pain is possible only after an understanding of the cause. Toothache is a symptom of pulpitis or pericementitis. If it be the former, the cavity is to be closed; if the latter, it is to be opened. Phenol is a superior remedy for producing instant relief for pulpitis. Opening the pulp cavity in pericementitis usually afford relief in twenty minutes; occasionally, the relief is immediate.

Soreness to pressure, usually pathognomonic of putre-

scent pulp, should be regarded as positive only after it is proved, for occasionally we find pus in the pulp cavity while the pulp is still sensitive, with pericemental involvement from extension of the inflammation. In these cases relief is obtained by careful extension of the exposure to relieve pressure, followed with phenol to stop pain. This dressing sealed in for three days usually permits the removal of the pulp at the end of this time.

With pericemental involvement beyond this stage means incipient abscess from putrescent pulp, the first indication being free vent without attempt to enter canals lest mixed infection be forced through. If, after a day, relief from pain is not obtained, then partial mechanical cleaning of the canals is indicated, followed with the formalin paste and temporary seal, the application of formalin to the gum as a counter-irritant and the constant use of a capsicum plaster or a hot fig. Such procedure is designed as tentative treatment to abort an abscess, and, while often effective, positive prognosis of the immediate outcome cannot be made.

If the state of development of the inflammation is such that resolution cannot be established, then this same treatment helps suppuration without causing it. The patient should be seen daily, and if pus does not result within three days from the appearance of the swelling, then the canal dressing should be changed at once; again in twenty-four hours, then in two days, and the last treatment left for several days as a precautionary measure before filling.

The Temporary Teeth.—Cavities in the temporary molars, more frequently than in the permanent ones, are in the proximal surfaces, and, regardless as to whether the occlusal surfaces are involved, they should be so extended for direct access. It will, as a rule, be found the best practice to fill these cavities with amalgam that the one operation may last

the life of the tooth. Time is saved by using a matrix. Tin-foil burnished over the surface of the filling, extracts excess mercury and speeds hardening. Finishing beyond removing excess material, as the gingival margin and clearing the occluding tooth, is unnecessary. Phenol should be the last application before filling.

Apparently reflecting their destined transitory purpose, pulps in these teeth show less resistance than those of the permanent ones, together with the fact that the pulp is sooner involved by decay explains why capping is less frequently indicated.

It may, however, be the means of prolonging the time for a more extensive operation, and, for this reason, serve an important purpose in dental child-training because of the painlessness of the procedure. Again, in the event of an operative exposure the material given being both anesthetic and antiseptic, prevents postoperative pain and suppuration. At the time when the wearing of the cement filling would require further treatment, the course to be pursued would be governed by the time yet remaining for the permanent successor to erupt.

When devitalization is required, the same method recommended for the permanent teeth will be found effective; subordinating quick results to the avoidance of pain. The mechanical and chemical treatment of the canals is necessary as before stated. With the superior virtues of sodium potassium, sulphuric acid should not be used. Oxychloride of zinc, to the powder of which is added iodoform at the time of mixing, is pumped in all the temporary root canals, observing care to avoid pressure. As it is to be expected that such work would only be spent on a tooth having several years to remain, amalgam becomes the logical finishing filling.

A Last Resort to Avoid Extracting.—It is of daily occurrence among neglected little children to see a temporary molar pulpless, with pericemental attachment that would be painfully resistant to the forceps, with one year or more remaining before the time for the normal appearance of its permanent successor, with the limitations of time and poverty curtailing the to-be-desired remedy and pity forbidding extracting.

More than this, possibly all of this first set with ragged enamel margins surrounding cavities housing infectious bacteria, unchanged, by mastication, or washed by the oral fluids, until from decalcification, pericemental and alveolar necrosis all are lost like sequestra. A condition causing septicemia oftener than is recorded demands quick remedy.

We all have seen crownless roots in the mouth, even with the gum line without abscess or noticeable pericemental infection, lost after years by slow decalcification of the exposed surfaces, atrophy, and exfoliation without the sign of pus.

Observation of this fact suggested the feasibility of artificially producing this condition as a measure of last resort to prevent the consequences resulting from premature extracting.

One preliminary requisite for alveolar abscess is the lodgement and protection which a partially enclosed carious cavity affords to pus-producing bacteria—it is the mechanical requisite—therefore, with this removed, we have destroyed one of the essentials necessary for the production of pus, and happily, as with all our work, some trust must be given to nature's support, so does it follow here.

With a large corundum stone revolving across the portion of the tooth to be removed, the buccal and lingual walls

are ground away to the gum line, leaving the likely one sound wall remain, the walls of the pulp cavity are burred out to diverge from the floor, the fistulæ irrigated with germicides, the exposed tooth surface treated with silver nitrate and the child told to wash the mouth with salt (sodium chloride).

The remaining mesial or distal wall, if any remains, in time breaks away, the free opening permits changes of the lodging food debris by mastication and free access of the changing fluids in the mouth, the canal mouths offer less resistance to the egress of the products of fermentation than does the apical ends.

By this simple and quick mechanical measure the formation of pus is stopped, space is conserved for the permanent teeth, and the operation is painless.

ORTHOPEDIC DEFECTS.

The grosser orthopedic defects can generally be detected as the child walks toward the examiner; but owing to the fact that it is forbidden to undress a child for examination, the moderate defects are most likely to be overlooked. Of the more apparent defects, coxalgia or hip deformity, which may be due to injury or disease around the joint (generally tuberculosis), may be observed by the characteristic gait. Defects such as wry-neck or torticollis are apparent to even a non-medical examiner, as also are knock-knee (genu valgum), eversion of knees; inversion of knees (genu varum); and club-foot (talipes).

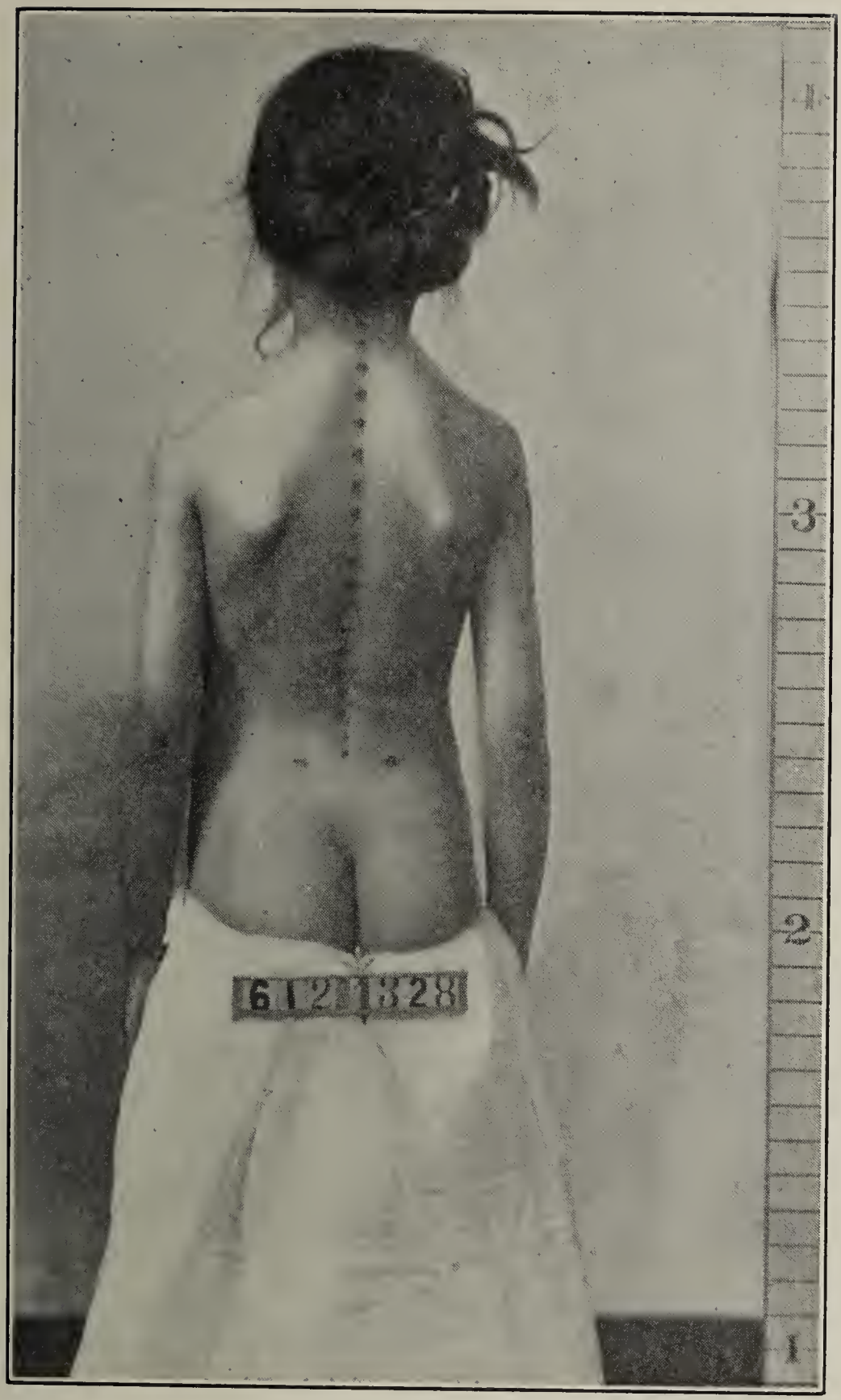
If a curvature of the spine is well-marked there is little need for a special examination, but where a moderate amount of defect exists, diagnosis can be made only by undressing

the child. Before diagnosticating spinal curvature, the examiner should be assured that the manner of dress is not simulating a defect. The author has frequently observed a foreigner who seemed to be a hunchback, but the supposed defect proved to be only a bunch of clothing huddled on the back drawn up by a pair of tight suspenders on a boy or ill-fitting clothing on a girl. Where a child comes from a cold climate it is not unusual for it to be clothed in three or four shirts and as many petticoats and dresses.

Scoliosis.—Scoliosis, or abnormal curvature of the spine, is often found among school children. Investigations by authorities in the United States and other countries show this defect to exist in varying degrees in about 20 per cent. of the school population. The percentage is slightly greater among boys than girls. The common type of school deformity is a functional or false scoliosis, and not a severe structural form (Figs. 58 and 59). There exists a moderate degree of convexity toward the left. These cases are mostly due to faulty positions in standing or sitting.

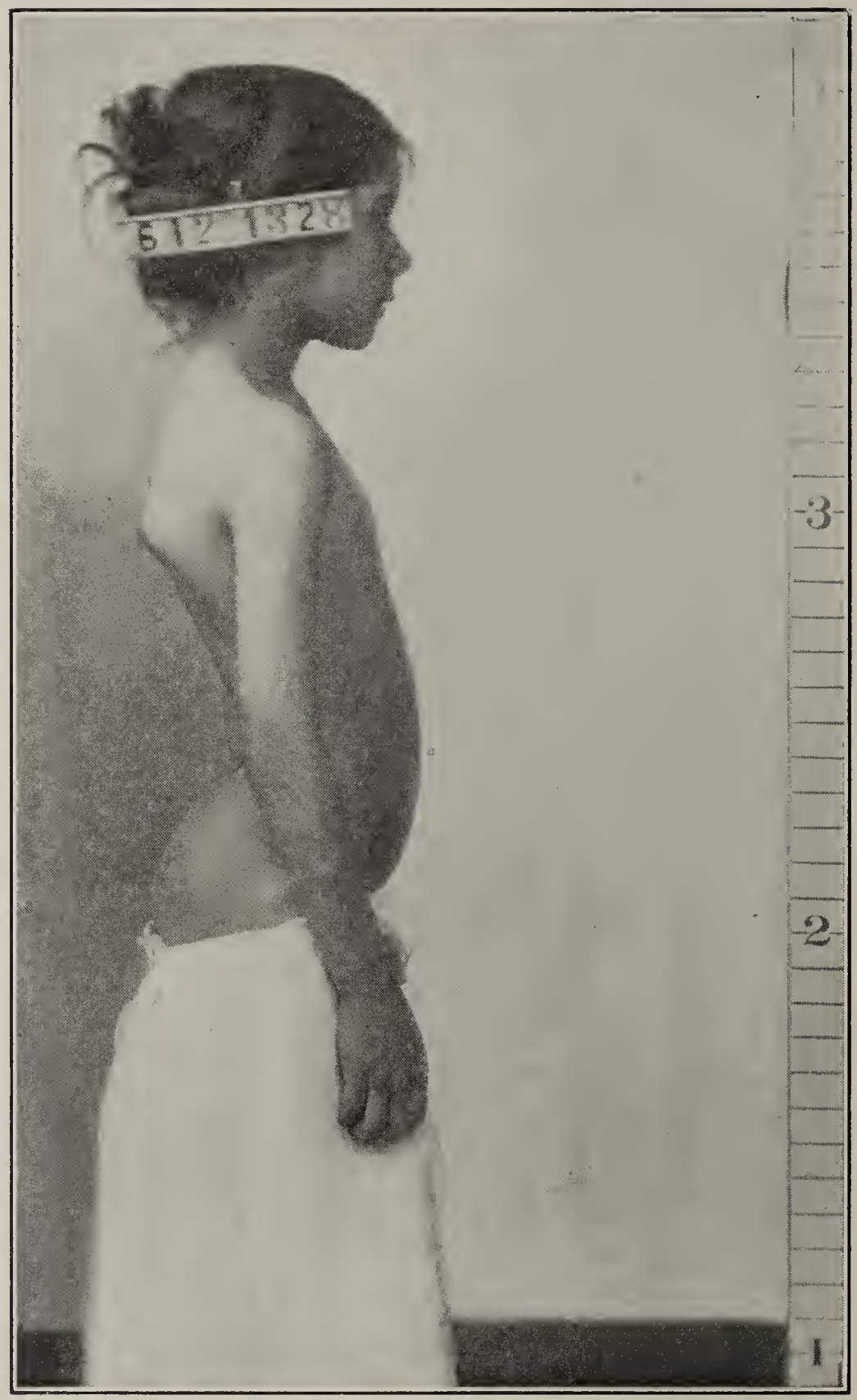
The other variety or degree of scoliosis is readily diagnosticated and includes marked structural changes and deformities. It occurs where a child is weak, poorly nourished, and lacks bone and muscle resistance, in addition to faulty posture. Diseases and defects which reduce the vigor and health of the child, decrease its resistance to abnormal and long-continued strain, and predispose the child to spinal troubles. Habitual bending over desks while reading or writing produces a posterior curvature or kyphosis of the spine. If a twisting of the body is added to this faulty posture there results a scoliosis or lateral curvature. There can be no doubt that faulty school furniture, with improperly adjusted seat and lack of support for the back, is an important factor in causing spinal deformities.

FIG. 57



Typical case of left scoliosis; physiological curve.

FIG. 58



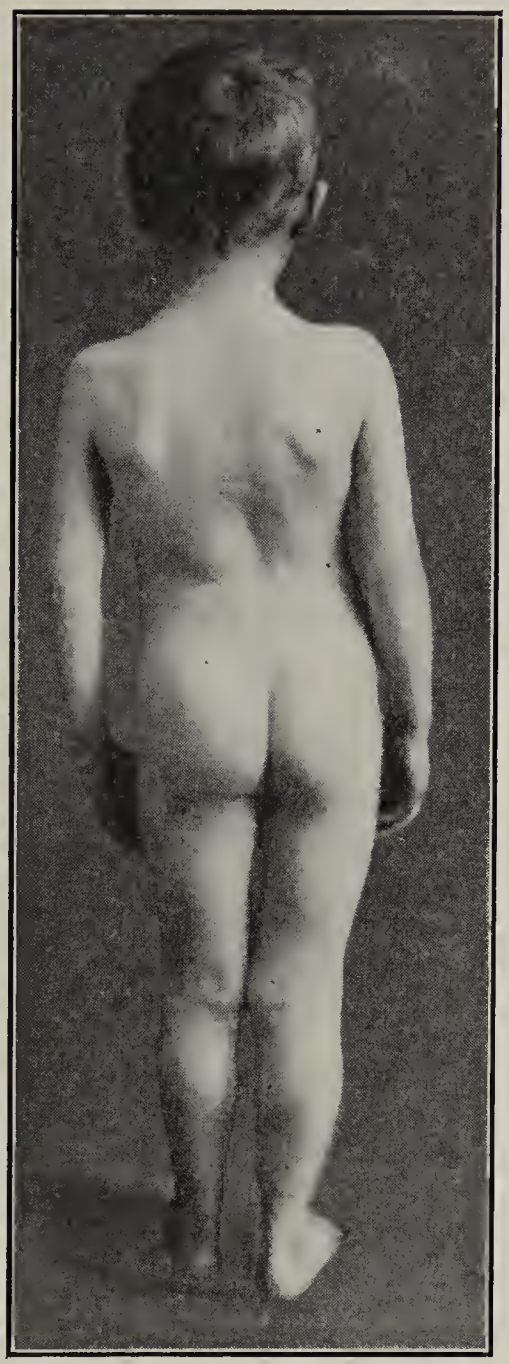
Antero-posterior position, showing physiological curve.

Other Defects.—Kyphosis is a posterior curvature of the spine with the convexity directed backward. It may be due to rickets or long-continued illness. The examiner should bear in mind that there may exist normally an unusual prominence of the seventh cervical or eighth and ninth dorsal vertebræ.

Lordosis consists of a curvature with the convexity forward noticeable in the lumbar region.

Stoop shoulders or round shoulders is chiefly a defect due to habit, though augmented by poor physical condition and malnutrition. The habit may be acquired by stooping over to read and write when defective vision is present. Persistent training is required for its correction, and in addition, braces are often needed. Tonics, nourishing food, and fresh air aid in the treatment.

Fig. 59

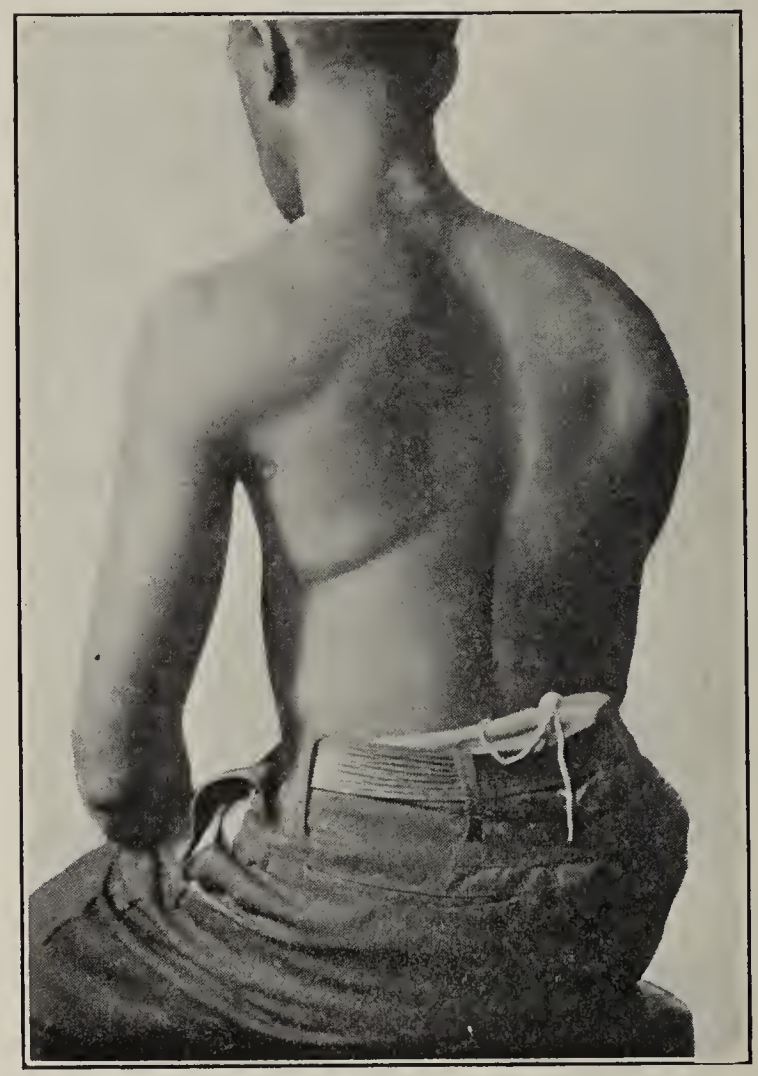


Marked lateral deviation of the spine, with rotation. Deformity at the eighth dorsal vertebra. (Whitman).

Marked orthopedic defects are often acquired in infancy, due to rickets and other diseases affecting nutrition. These cases require surgical interference. Curvatures of the spine are often caused by habits of faulty posture in standing or sitting, desks and chairs not suited to the size of the child carrying heavy loads on one shoulder, etc. Care should

be exercised in the hygiene of the school-room with relation, to the posture assumed when sitting or standing. Proper desks and seats should be supplied and the teacher should at all times correct faulty posture. Physical exercise as

FIG. 60



A marked case of asymmetry and spinal curvature.

practised and taught in most schools accomplishes much in encouraging standing erect, and some of the exercises are important in the correction of moderate degrees of spinal curvature and deformity.

SKIN DISEASES.

A knowledge of dermatology, especially the differential diagnosis, is essential for the proper examination of school children. Almost any of the many diseases of the skin may be found among the pupils, but in the following pages the field is covered only so far as it is of interest and value to the school examiner, and unnecessary detailed descriptions of the diseases omitted. It is the duty of the school physician to recognize every eruption on the skin, to promptly eliminate the contagious from the non-contagious, and to protect the school from an epidemic of an infectious disease or a contagious skin disease. The spread of contagion in a school may reflect upon the efficiency of its attending inspector, and he must, therefore, be mindful of those eruptions which are secondary to and symptomatic of the exanthemata.

Most of the symptoms are objective and visual, and the diagnosis must generally be made by the eyesight alone. It is impossible to represent in words the manifold impressions of the characteristics, color, and shape of the various lesions which should be seen and studied to admit of diagnosis of similar cases.

For the purpose of school inspection, skin diseases may be classified into:

1. Systemic contagious diseases, including measles, scarlet fever, smallpox, vaccinia, chickenpox, and German measles.

2. Non-systemic contagious skin diseases, including ringworm of scalp, ringworm of body, favus, scabies, impetigo, and pediculosis.

3. Non-contagious skin diseases, of which the most frequent are eczema, acne, herpes, urticaria, alopecia, carbuncles, furuncles, and psoriasis.

Contagious Diseases.—The group of systemic contagious diseases belongs rather to the domain of general medicine than to dermatology and has been considered in the part on "Infectious, Contagious, and Communicable Diseases."

FIG. 61

Ringworm of scalp. (From Dr. G. H. Fox's Atlas of Skin Diseases.)

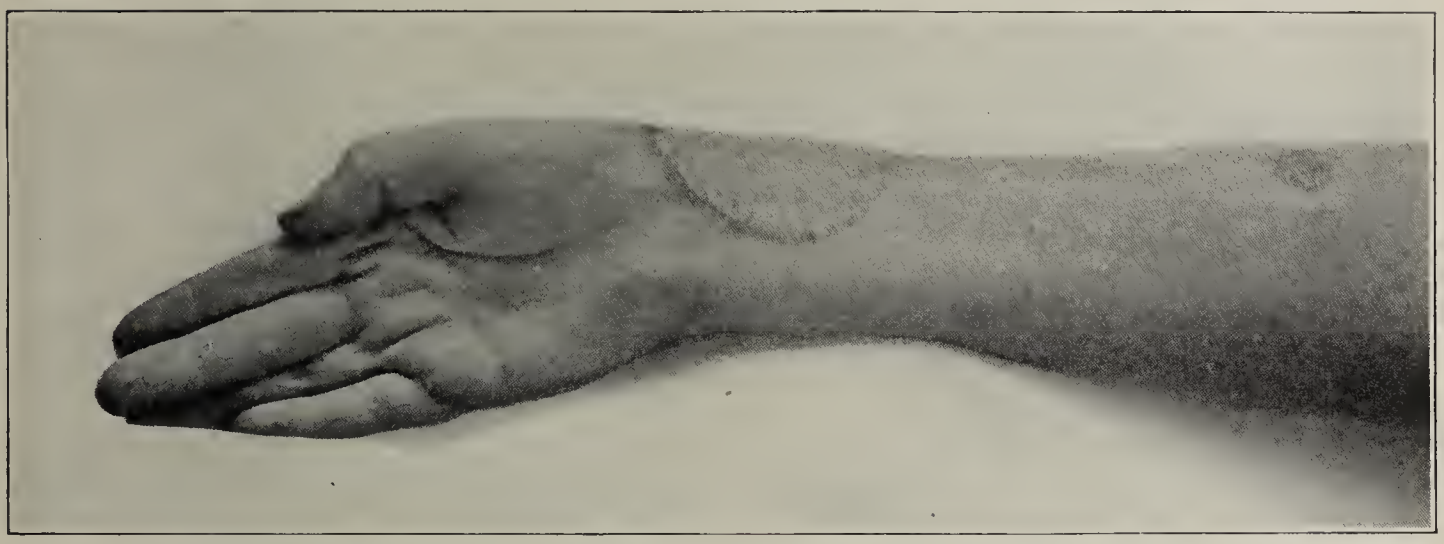
In making a diagnosis the inspector should consider the character of the eruption, the lesions, their location and distribution, the history and mode of invasion, and the association of systemic symptoms.

Ringworm of the scalp is a parasitic disease of the scalp characterized by circular or diffuse, inflamed, scaly patches, with diseased and broken-off hairs. It is of common occurrence in children, and generally covers an area of not more than one or two inches. At the margins of the patch are found inflammatory papules, vesicles, and pustules, and the

broken-off hairs are covered with a grayish dust. Ringworm can be diagnosticated from favus by the absence of the peculiar sulphur-yellow, cup-shaped crusts.

Ringworm of the body occurs most frequently on the arms, face, or neck. It begins as a small, circular, slightly raised, circumscribed area, which enlarges peripherally and the margins remain red and composed of papules and vesicles covered with a fine scaling, and the centre gradually fades. It must be distinguished from eczema and psoriasis.

Fig. 62



Ringworm of the body. (From Dr. G. H. Fox's Atlas of Skin Diseases.)

Favus is a contagious parasitic disease most often on the scalp. Its characteristic form is lemon or sulphur-yellow, cup-shaped crusts, firmly adherent to the scalp, and when they come away there remains a deep pitting from loss of tissue. There is a peculiar odor, sometimes termed "mouse odor," which accompanies the disease.

Scabies, or "itch," is a contagious animal parasitic disease characterized by itching and various lesions of papules, vesicles, pustules, crusts, and, excoriations chiefly on the hands, abdomen, and inner aspect of the thighs. The itching is most severe at night, because the parasite is more active

at that time. The burrows appear as white or yellow streaks, about one-quarter inch long, and dotted with minute black spots.

An itching rash on the back of hands with scratch marks and burrows between the fingers should suggest scabies.

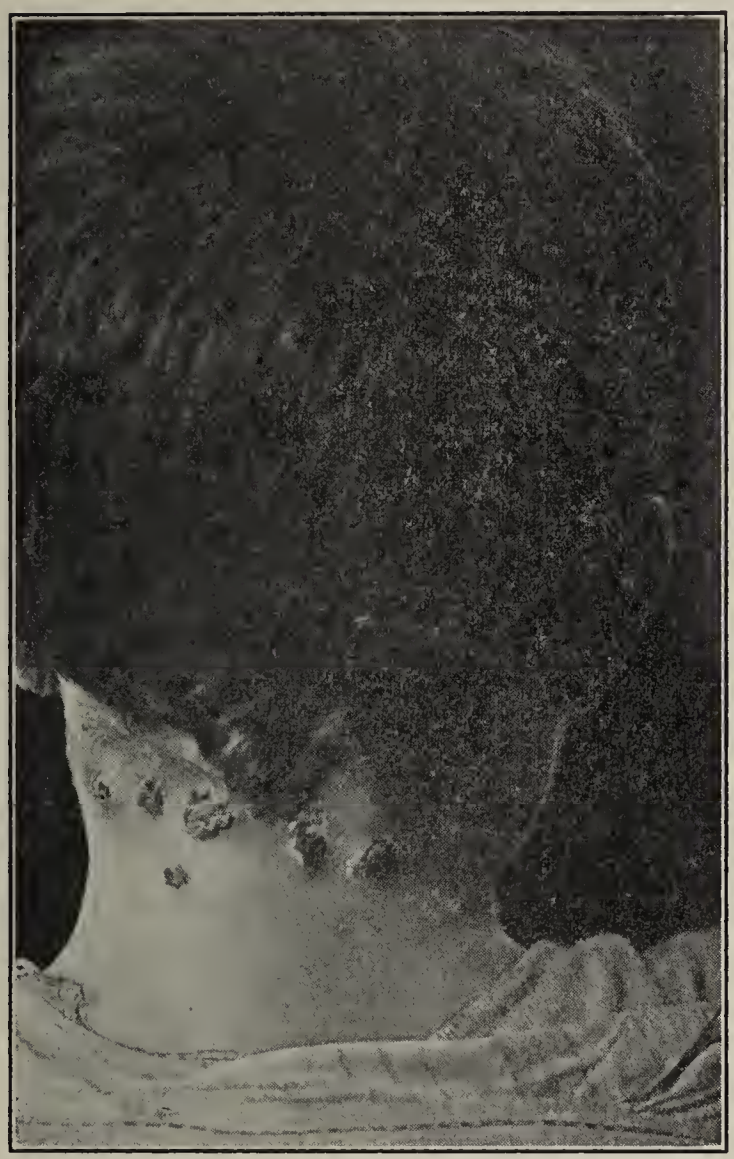
FIG. 63

Impetigo contagiosa. (Hyde.)

When possible it is well to confirm the diagnosis by examining the lower abdomen and inner parts of thighs for a similar rash. The inspector should inquire if others in the family have the disease, and examine all children of that family who attend school.

Impetigo contagiosa is an acute inflammatory contagious disease appearing in isolated patches of vesicles, pustules, and crusts, generally on the face. It is to be distinguished from eczema.

FIG. 64



Pediculosis capitis. (Courtesy of Dr. S. I. Rainforth.)

Pediculosis of the head is characterized by the appearance on the scalp of the live pediculus and its ova, and a secondary eczema and dermatitis, which may spread to the face and neck. If unattended, the hair becomes matted together into a foul-smelling, decomposing mass of crusts and dirt. The vermin are freely communicated in the schools, especially where there is an interchange and close contact

of hats and wraps. It is the most common of all skin diseases and the examiner must not be deceived in diagnosticating the disease, by the fact that the children are clean, well-dressed, or from so-called good families. Suspicions should be aroused whenever there exists a rash with scratch marks on the back of the neck or parts of the body where clothing comes in close contact, as on the shoulders. The vermin and nits are readily seen among the hairs.

On the body, pediculosis appears as minute red dots surrounded by a wheal, together with crusts and scratch marks, due to the itching. The location of the lesions on the neck, waist band, shoulders, buttocks, and thighs and the finding of the parasite distinguishes the disease from eczema and other affections.

Treatment.—All children with an eruption suspicious of the acute infections, and any contagious skin disease not under treatment, should be excluded from school. Scabies should be excluded until cured; pediculosis, until no vermin can be found. Impetigo and ringworm may be allowed in school if under treatment and painted with tincture of iodine or collodion. Scabies should not be treated at school, but the nurse may go to the home and instruct the mother how to apply sulphur ointment. Applications on three successive days generally make it possible for the child to attend school with safety. Care must be exercised that the child does not reinfect itself through its clothing, especially pockets, or through the bedclothing at home. Both ringworm of the scalp and favus are difficult to treat, having a tendency to be chronic.

Pediculosis should not be treated at school, and as treatment must take place at home, the parents should be instructed as to the best method of cleaning the scalp. With many parents, considerable diplomacy is needed in notify-

ing them of the existence of the condition. Antagonism can often be avoided by giving the impression that the origin of the contagion rests with some other pupil in the class-room, and thus avoid any suggestion of uncleanliness in connection with the child under treatment.

The following circular of instructions for treatment is also effective:

BUREAU OF HEALTH.

NOTICE TO PARENTS.

When a pupil of the public school is excluded by the assistant medical inspector on account of having an unclean head, the following remedies may be resorted to in order to cure the condition:

Take equal parts of kerosene oil and sweet oil—mix and saturate hair and scalp thoroughly with the mixture. Tie head in towel and leave it so one night. Next morning wash the child's head with hot water and soap, and remove all traces of the oil. After thoroughly drying, saturate with vinegar, separating hair into strands, and brush with stiff brush.

After such treatment, the pupil may return to school and inform the medical inspector what has been done; or the parents may send a note, indicating what treatment pupil has had. If result is satisfactory, pupil may be readmitted.

Non-contagious Diseases.—The non-contagious skin diseases are numerous and a few, including eczema, acne, herpes, and urticaria, are frequently found among school children. It is unnecessary for the examiner to be acquainted with all of these diseases, as, aside from the discomfort given the child, they rarely interfere with its education. Treatment should be insisted upon in all cases.

DISEASES OF THE NERVOUS SYSTEM.

The medical examiner of school children may diagnosticate only those diseases of the nervous system which have characteristic symptoms, such as chorea or epilepsy. Unusual nervousness or lack of nerve control cannot be diagnosticated by a mere inspection, as it is natural for some normal children to be unduly nervous when appearing before a stranger. This is especially so when the child knows it is a physician whose purpose is to examine him. In these cases the diagnosis by an observing teacher is of more value. If the inspector sees a child in a paroxysm he may diagnosticate epilepsy, otherwise the history of the case as given by teacher and child is sufficient evidence. Chorea shows some symptoms most of the time, while hysteria shows symptoms when watched and must be caught off guard.

Epilepsy consists of periodical paroxysms of convulsive attacks with a loss of consciousness. These paroxysms vary in frequency and severity. The cases vary from the mildest attack of "petit mal" to the severe "grand mal."

These cases are dangerous in a public-school room, not only because they upset the discipline of the class, but on account of the danger of a child falling and receiving an injury during an attack. A case with frequent attacks is, therefore, sufficient cause to exclude a pupil from school.

The cause of epilepsy may be syphilis, traumatism in rare cases, reflex irritation from genital organs, masturbation, and eye-strain. Heredity undoubtedly plays an important role.

Several investigations have shown that errors of refraction and muscular eye trouble are found in a large percentage of cases of epilepsy. While this does not necessarily mean that these errors are the cause of the disease in all

cases, it is logical to infer that the ill effects on the nervous system, especially in children, are an important factor.

Every case of epilepsy should receive a thorough systematic examination of the eyes, not only for refractive errors, but muscle unbalance, and it is the duty of the medical officer and teacher to see that parents obtain such an examination and the proper treatment. A number of cases have been reported cured by such treatment.

Chorea, commonly known as St. Vitus' dance, is frequent in children and while heredity is an important factor, the general history may show some previous injury, shock, or fright, reflex irritation from the genitals, intestines, dentition, or eyes. The disease may be acquired by imitation. Therefore, in chorea, epilepsy, and other nervous diseases the eyes should be examined under a mydriatic. Habit spasm, consisting of gestures, shrug of shoulders, winking of eyes, or grimaces, may be the remains of a previous attack of chorea.

Hysteria is rare among school children until puberty or after the age of twelve. Imitation may be found in some cases of hysteria. The symptoms manifested are as varied as the number of cases, and may include disturbances of the sensory organs, motor apparatus, and even visceral disturbances. The absence of any organic disease, and, upon careful watching, the discovery of certain symptoms characteristic of hysteria, may aid in a correct diagnosis.

SYSTEMIC DISEASES.

General Considerations.—It is beyond the scope of medical inspection to definitely diagnosticate the diseases which belong to the field of internal medicine. Scientific conscientious

physicians require a thorough examination of a patient before rendering a diagnosis. The school doctor in his routine work has neither the time, the place, nor the equipment for such work, and even though he had the opportunity, neither the child nor the school would benefit by the work. All cases presenting symptoms of visceral trouble should be referred to a physician or dispensary for diagnosis and treatment. An old-fashioned "bellyache" by symptoms may prove appendicitis on careful examination. The author does not approve of the disrobing of a child in school for an examination of the chest or abdomen, and the mere placing of a stethoscope over the clothing does not warrant a diagnosis of cardiac or pulmonary disease. When symptoms exist the school doctor should recommend a visit to a physician or the dispensary.

Frequently a child is sent to the school doctor for examination of the chest to determine fitness for physical exercises. In these cases an examination should be made of the pulse, respiration, and heart sounds as revealed by ear alone or aided by a stethoscope. All children giving signs or symptoms of cardiac insufficiency should be debarred from entering physical contests. Defective breathing, if based on mere routine inspection, is very common among children, due chiefly to habit. Physical exercise, a part of the curriculum of most schools and public playgrounds, has done much to eradicate this defect.

Malnutrition.—Anemia and malnutrition of all systemic diseases most frequently concern the school inspector. Pallor is not always a sure sign of anemia, and a blood examination is sometimes needed to confirm the diagnosis.

Malnutrition may be suspected where a child is pale and too weak to properly work and study, but the number of cases in the schools is much over-exaggerated. Where

it is due to lack of food, it is not always poverty, being often caused by one or more of numerous home conditions. This

FIG. 65

A typical underfed family. A source of cases of malnutrition.

is more of a sociological than a medical question, and can best be solved by the nurse or social visitor going to the

homes, where tact and diplomacy may reveal the cause and suggest a remedy. Some of the causes are poverty; late hours with loss of sleep; work after school hours, especially at night; sleeping in an unventilated room and ignorance as to the kind of food suited for a school child. Most of these causes can be readily remedied. Poverty should be referred to one of the charities, and if late work at night is due to need of additional income, this also belongs to the charities.

School Lunches.—The supplying of lunches, consisting of soup, crackers, rolls, and pudding to the school children for a few pennies, has received considerable impetus in America. The success or failure of this undertaking depends altogether on the purpose for which it is intended. If these lunches represent an effort to conserve the health of children and discourage the purchase of impure and unclean candy and pretzels, peddled around the school, they are a success and a great benefit; but as an aid to poor families, they are a failure, because the school children of very poor families are not given pennies to spend at school. Should they be given these lunches free, the nourishment supplied would not be sufficient for the twenty-four intervening hours until the next lunch, and from Friday until Monday. Where poverty exists sufficient to admit of improper nourishment of the children, it becomes a problem for the organized charities and not a makeshift for the schools.

Lunches of milk, eggs, and crackers supplied free to the children attending open-air schools is of great value, and becomes part of the curriculum of these classes. The nourishment together with periods of rest and plenty of fresh air are the things which improve the child's general health and aid in the fight against tuberculosis. This use of school lunches is to be highly commended.

Sex Hygiene.—In public elementary schools the medical examiner is but rarely called upon to diagnosticate any of the acquired venereal diseases. Sometimes a teacher may observe a child continually rubbing around the genital organs, and seek an opinion of the medical officer. Thus he is occasionally asked to decide if a child masturbates, and if so what action should be taken. A tactful questioning of such a child often evokes an answer of itching or discomfort of these parts. Lack of cleanliness, possibly the most frequent cause, and abnormalities, such as adherent prepuce, are occasionally found.

The teaching of sex hygiene in the schools is to be highly commended, and talks may be given by the teachers or the visiting physician. The author believes that much can be accomplished by sensible talks to both sexes, and regrets that space will not permit of outlining a course of lectures. Especially in the higher grades, talks should be given which would teach the dangers and yet not excite the curiosity to experiment.

The author advocates conservative methods of teaching sex hygiene to the younger children, who have keen imaginations and may be more harmed than benefited. Knowledge of a subject does not take the place of moral stamina. Train the moral character, teach boys purity of thought and body, obedience and respect. The child should be told what kind of literature to read and to avoid the trashy melodramatic stories which now flood the market. The school should supply good books for home reading. The girl should be taught reserve, modesty of manner and dress, and purity. Teach the parents at school meetings the rudiments of sex hygiene and the relation of moral home life to the problem. They should at the proper time teach the child what it should know.

Personal Hygiene.—The duties of the medical officer in the school-room inludes the prevention as well as the diagnosis of disease. He should take every opportunity to teach healthful living at home and school and should impress the pupils with the need of cleanliness of body, mind, and clothing. Method of dress in its relation to health should receive his attention, and he should condemn the wearing of corsets, tight clothing, tight garters, and heavy clothing suspended from the waist instead of the shoulders. His instructions should supplement the teacher's course in practical hygiene. Where nurses and social visitors are employed, they should observe on their home visits any refractions from the laws of health and try to have them corrected. This is important because uncorrected faulty home conditions tend to nullify the teachings and efforts at school. Medical inspector, nurse, and social visitor should acquaint themselves with the laws of their State and city pertaining to housing conditions and what constitutes a nuisance, and any unsanitary conditions of the dwellings or streets should be reported to the proper health authorities for their action.

The teaching of personal hygiene should be an important branch in the curriculum of all grades, and should include cleanliness, clothing, diet, exercise, proper rest of both body and mind, and a strict observance of all rules for good health.

MENTALITY.

Considerable interest has been shown in the past five years in grading children in the public schools according to their mental status. The child who was found to be below the normal average has been singled out and studied for the purpose of adopting some method of educating him

with the least amount of interference with school work and at the same time to obtain the best results for the individual child.

The precocious or supernormal child is also of interest to study, as such children are often responsible for the setting of too high a standard for educating the average child. The precocious child, naturally of a nervous temperament, is pushed forward too fast to the detriment of its physical health.

Classification.—The retarded subnormal and mentally defective child for practical purposes may be classified into the following groups:

1. Retarded in one or two subjects.
2. Subnormal, or a child who is mentally behind the average child of the same age. These may also be termed "backward" or "dull" pupils.
3. Mentally deficient or those who are so far behind average children of the same age as to be unable to acquire an education through the usual channels.
4. Feeble-minded or those whose mental faculties are absent.
5. Idiot or imbecile, which includes those with no mentality that have associated paroxysms of nervous phenomena making them unsafe to themselves and others.

There are no sharp lines of demarcation between these various classes, and they coalesce, making the defect one of degree only. The idiot or imbecile cannot be made safe enough to place in society or school, and is purely an institutional case. Every State should have sufficient institutional room to care for this class and prevent as much as possible their further propagation.

The feeble-minded through inherited defects of the brain should be classed with the imbecile and placed in suitable

institutions where attempts may be made to give some education that may aid the unfortunate in eking out an existence.

Those feeble-minded from an acquired physical defect should be placed in institutions where they will receive medical care that may correct physical defects and special training which may later improve the mental faculties

FIG. 66

Feeble-minded children.

sufficient to enable the child to again be placed with its family. These cases rarely take place in society. It has been stated that of the inmates of an asylum for feeble-minded, 25 per cent. could be made useful men and women by correction of physical defects.

The mentally deficient, the subnormal, and the retarded children may be studied together. We should consider the

causes, the method of diagnosis and treatment of these various defectives.

Prevalence of Retardation.—The number of mental defectives average about two to every thousand of population. The number of subnormal children in the public schools varies with the method of examination, the examiner, and the standards adopted in determining the defects. The report of the Committee on Special Education of the Philadelphia Teachers' Association showed the existence of 11,543 subnormal children, which was slightly in excess of the number of children who were two or more years in grade for the year ending June 30, 1908. The number allotted as institutional cases of feeble-minded was 442, and approximated the number three or more years in grade 483. Of a total of 881 children enrolled in the special schools, 51 were found to be feeble-minded, institutional cases; 538 properly belonged to special schools, including incorrigibles and truants; 213 were backward and could be taught by special instruction.

Causes of Retardation.—Causes of retardation and the subnormal child may be grouped as follows:

1. Physical defects.
2. Home surroundings and environments, causing chiefly incorrigibles and truants.
3. Faulty educational methods and inexperienced teachers.

We must not accept as conclusive evidence of deficiency every child labeled defective by a teacher. When a teacher asserts that many of her pupils are dull and defective, the first thing to observe is the teacher herself and her methods. All children are not equally intellectual, and a fair average must determine the normal standard. One precocious child in a class is apt to increase the teacher's standard, and it is inadvisable to use all the available faculty and nerve

force of such a child by frequently advancing it a grade. It is far better to devote less time and teaching effort to such a case and more to the less advanced child. The precocious child is often one who is receiving care and teaching at home.

An educational system must be elastic enough to reach both the mental capacity of the slowly progressing but normal child and the precocious one. The teacher should study the best methods to impart knowledge to each child as an individual, and subjects should be outlined to meet the capacity of the average.

Home Surroundings and Environments.—This is a most important causative factor. In suspected cases of mental deficiency or backwardness, the physician, nurse, or teacher should visit the home and intimately study home conditions. Work after school hours and at night, late hours with loss of sleep, poverty with insufficient nourishment, worries or great responsibility, are some of the many conditions which may be revealed. Where parents lack control over a child and there is added the influence of morally bad associates, there exist two influences that will produce the truant and incorrigible child. These children belong in a class of their own and the solution is the "Parental School." Before disposing of the truant or incorrigible, a thorough physical examination should be made and any physical defects found should be corrected. One can readily understand how a child with some defect, such as bad vision, unable to cope with the school problem, willingly drifts into this class.

The public school is no place to attempt to train a mentally defective child, and it is no credit to an educational system that, by special instruction, succeeds in teaching it, after three years' daily training, to place pegs in holes in a board.

Such a child never becomes a suitable person for society. The object of the school is to fit a child for society and citizenship.

Physical defects causing retardation and subnormal children are malnutrition, exhaustion, and fatigue due to poverty or some systemic disease; fatigue due to some home conditions, as late hours, the use of alcohol, drugs, or tobacco; toxemias, such as constipation in children, which may produce an auto-intoxication, headaches, loss of sleep and nervousness unfitting the child for study; rheumatism and uric acid diathesis which may cause nervous, ill-tempered children. Syphilis and its effects, especially on the nervous system and mentality, is a more frequent cause than is credited. Other physical defects are diseases of the nervous system, including epilepsy, chorea, and the minor degrees of nerve unbalance termed "nervousness." Many of these cases are secondary or symptomatic of other defects, such as eye, ear, nose, and throat trouble. The nervousness in these cases is chiefly a reflex symptom.

Defective hearing and some of the nose and throat defects, such as adenoids and enlarged tonsils, may cause retardation, especially when the general nutrition and health of the child is impaired.

Defective vision, hearing, and speech are probably the most important physical defects in relation to retardation. A child who does not hear well or who cannot see properly cannot receive correct impressions on its mental apparatus, and therefore must be below the standard of normal children.

The following case found in one of the public schools illustrates the effect of defective hearing:

A girl, aged fourteen years, two years in the second grade, and three or four years in the first grade, was promoted to second grade only because the teacher was ashamed to keep

her any longer. This child was found on examination to be almost entirely deaf, and also to have a defective speech. She deceived the teachers, as well as possibly the parents, by guessing at everything said to her, using the movements of the lips as a guide. This child on examination was found to have a bony growth as well as adenoids entirely covering and obliterating the Eustachian tubes. This was the cause of both defects, and after operation the child greatly improved mentally.

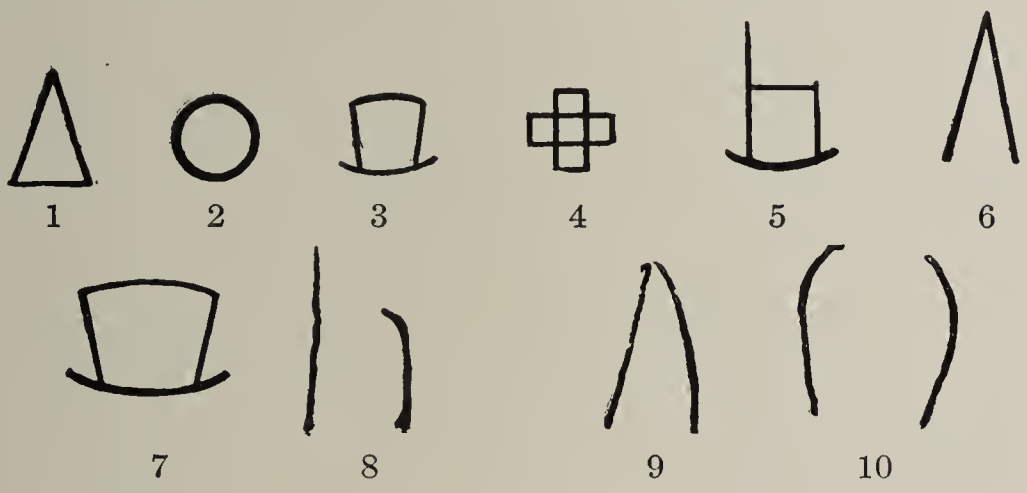
The following is an example of defective vision:

Mary D., aged eleven years; nationality, Italian; in this country two years; in first grade sixteen months. Sent by teacher with this note: "This child cannot talk; apparently dumb, as it makes signs and motions for everything it wants to say, and in answer to all questions." I asked the child: "What is your name?" "Mary," she answered, in an indistinct whisper. "How old are you?" and several other questions, elicited nothing but nods of the head and shrugging of the shoulders. The entire time while being questioned her face was set in a silly grin, and she nervously took hold of my coat, systematically played with each button, as though counting. As she had a very marked squint I believe her eyes were one of the offending members. She seemed to know no letters, or figures, and was unable to follow an illiterate test card. I held up two fingers a few feet from her, and asked how many fingers? She answered "four." To three fingers she answered "six." As this was as much as I could get her to answer, I was not prepared to say the child saw double. On being handed some pencils, she made no effort to count them. Thinking possibly the child was unacquainted with our language, I called an Italian boy, and had him speak to her in Italian, and asked her to answer in Italian. This did not succeed, as she

answered but one more question, the name of her father. I pointed to her teacher, and asked, "Who is this?" She answered correctly and distinctly, but in a whisper. She accomplished the same in reference to the principal.

I wrote on the board the following, and with the child seated about 15 feet away I asked her to copy. A normal child seated near her was also asked to copy the same, which was done correctly:

The abnormal child made no effort to copy 1, 2, 3, or 4, which were drawn 6 inches high and wide. But figures 5, 6, and 7, which were drawn 3 feet high and wide, were copied as shown in figures 8, 9, and 10. The child seemed not to see or draw horizontal lines. This case proved a marked mental deficiency due to defective vision.



Various cities and various countries report proportions of defective vision ranging from 25 per cent. to 50 per cent. of the school population. The question is, How many of these children with such defects untreated can be considered mentally deficient or subnormal? All are, for a child that cannot see correctly must get wrong impressions and make wrong conclusions. He is usually deficient in writing, reading, and spelling. Again, headaches, whether due to an error of refraction or muscular unbalance of the eyes, causes a languid nervous, and

inattentive pupil. Cases have been reported in which are found good vision, no strabismus, no great refractive error, and yet the investigation of the muscular status shows that a latent hyperphoria was sufficient to incapacitate the child. Most of the statistics of investigation of the condition of the eyes of school children are based upon the common practice of allowing the pupils to merely read from a Snellen test card at a set distance. The child may see the smallest letters, and yet it is no sign that the child's vision is normal. The range of accommodation in children is great, and while one may discover the gross manifest errors, the important latent ones are overlooked. The duty of a physician to every child which is brought to him suffering from constant headaches, nervousness, indisposition, and dulness should be thoroughly examined under a mydriatic for both refractive and muscular errors, and these should be immediately corrected. It remains for the medical profession to overcome the widespread ignorance that children should not wear glasses because "by wearing them early the child will always have to wear them," or "we (the parents) never wore glasses." In later life they fall victims to the traveling salesman or the fake optician, though even these do some good in some cases, in that they correct some of the errors, by supplying glasses. The medical profession stands idly by and encourages this fake oculist work by neglecting to diagnosticate cases of defective vision in children.

Realizing that the only true idea of the subject could be obtained by the use of a mydriatic, and desiring to obtain the worse cases with the most glaring defects, the author requested the teachers to send to him those children whose work was subnormal, due to a possible defective vision. The following statistics of two hundred and fifty pupils examined under a mydriatic may prove interesting. All

of these cases were carefully refracted with the ophthalmoscope and retinoscope. Only twelve ever wore glasses before. All obtained the necessary glasses. Number of cases of strabismus, 27. Of 185 examined for muscle balance, there were 41; hyperopia, 60; myopia, 26; astigmatism, 164; hyperopic astigmatism, 86; myopic astigmatism, 45; mixed astigmatism, 33; astigmatism with the rule, 80; astigmatism against the rule, 67.

Methods and Records of Examinations.—To diagnosticate the presence and degree of mental dulness, the examiner should take a complete history and make a physical and mental examination of the child. The following are the things to be considered:

1. Early physical and mental history from time of birth to present (obtained from parents).
2. Present physical and mental history (obtained from teachers).
3. Mental examination by physician, using Binet's or other similar tests.
4. Physical examination by medical inspector.
5. Examination of eyes, ears, nose, and throat by specialists.

The early history of the child may furnish valuable information, and should include some history of the physical and mental status of the parents. Such information as difficult birth, use of instruments, marasmus, convulsions, syphilis, inability to walk or talk at usual age may be noted.

Too much weight must not be given to the assertion by teacher or parent that a child is feeble-minded, but full cognizance should be given to the school records of its education. The medical examiner should decide the degree of mental dulness, also if an institutional case or one for training in a special class, but only after an exhaustive examination.

In a study of retarded pupils the examiner should observe:

Defects in development, size, form, proportion, asymmetry, and weight of body.

Defects in nerve balance or muscle balance.

Defects in nutrition.

Physical defects.

Defects in development: The examiner should weigh the child and measure its height and compare with normal average for its age. Each part of the body should be scanned for lack of development and asymmetry. The head in particular may show evidences of poor development, and the site of fontanelles, ossification, protuberances, size of skull, and general expression of child should be noted.

Defects in nerve and muscle balance tell much about the nervous system of the child. The position taken while standing; the extension of the arms in front of the body showing drooping of the hands at the wrists, spreading of the fingers, nervous tremors, and twitching of the fingers, all should receive attention. Likewise, the balance of the body and spinal contour while the arms are extended should be noted. Results should be tried while the arms are extended to the sides. The rapidity or slowness of response to the command to extend the arms indicates the power of mental reception. The command should be first given in words only, then the power of imitation or response from vision tried by showing what is wanted.

The child should stand with feet close together, hands to the sides, and eyes closed; then any swaying or inability to balance body should be noted.

Defects of nutrition are told by weight, height, color of skin, especially the mucous membranes, and general appearances.

Physical defects are taken up under their various headings, eye, ear, etc.

FIG. 67

Testing coördination of nervous system.

The recording of investigations of backward or mentally defective children may be done on blanks similar to the following, which was devised by the author and used for such investigations since 1904:

Accurate answers to the following questions are important in the gathering of statistics of value in the treatment of mentally deficient pupils:
Name of pupil_____ Address_____
School_____ Grade_____How long in grade_____
Age_____ Nationality_____ Color_____
How long in school_____
This pupil has been considered dull, backward, mentally deficient, or below normal _____

The teacher will kindly answer the following questions:
Why do you consider him (her) as such?_____
_____
In what branches deficient?_____
In what branches proficient?_____
Yes or no—Lazy_____No ambition_____Mischievous_____
Nervous_____ Inattentive_____Poor memory_____
Bad morals_____Truant_____Violent temper_____
_____
Physical defects noticed by teacher_____
_____
This child has received treatment for_____
Has his mental condition improved since treatment?_____
In what manner?_____
_____
In which branches has he (she) improved?_____
_____

Family History.—To be obtained from parent or guardian.
Health of parent _____ Sisters _____ Brothers _____
Education of parent _____Sisters _____ Brothers _____
Mental condition of parent _____Sisters _____ Brothers _____
Was birth of above pupil with difficult labor?_____
Instruments?_____Any injury since birth?_____
Home conditions: Care_____Culture_____Discipline_____
Language spoken at home?_____
Is child required to work after school hours?_____
_____

Report of Physician.

	Abnormality. Asymmetry.
Nutrition _____	Trunk _____
Weight _____	Arms _____
Height _____	Legs _____
Nervous condition _____	Hands _____
Coördinations _____	Feet _____
Eyes _____	Cranium _____
Vision without mydriatic—	Forehead _____
R. E. _____L. E. _____	Face _____
Vision with mydriatic—	Ears _____
R. E. _____L. E. _____	Eyes _____
Color vision _____	Nose _____
Hearing—	Lips _____
R. E. _____L. E. _____	Palate _____
Throat _____	Tonsils _____
Speech _____	Teeth _____
Orthopedic defects _____	

Date_____Treatment Recommended:

Non-promotion and Mentality.—Numerous methods have been tried to test the intelligence of children and to sift

the backward from the normal. Some large cities have prepared a census of their mental defectives and subnormal pupils based on the time in grade; age in grade and non-promotion. This is not a safe method for diagnosticating mental deficiency. In 1909, New York City had 109,440 children who failed to win promotion in the first term, and 100,338 in the second term. There were 156,208 "over age" pupils in the grades and 20,000 "over age" in special classes. Yet it is hardly necessary to say that no one would think of classing this large army of overaged and non-promoted as mental defectives.

The causes of non-promotion or two years in grade are many, and although the child may be, he more often is not a mental defective. When, however, the child is three or more years in one grade he is invariably defective. The non-promoted child should receive careful consideration by the teachers to ascertain the underlying cause, and they should be compelled to ascribe a cause for each case. A careful record should be kept of the branches in which the child fails; those in which he is weakest and those which are performed best. The teacher should grade according to the child's power of application to the work.

Causes of Non-promotion: The following classification of causes of non-promotion may aid both teacher and physician in deciding when non-promotion means mental dulness.

Causes due to School or Teacher: 1. Faulty curriculum.
2. Lack of success of teacher.
3. Teacher and pupil incompatible.
4. Frequent absence of teacher.
5. Crowded class-rooms.
6. Standard for promotion too high.
7. Frequent change of teachers.

Due to Pupil: 1. Frequent change of schools.
2. Truancy.
3. Irregular attendance.
4. Late entrance.
5. Ignorance of English language.
6. Slowness, dulness, inattention, or idleness.
7. Mental defect.
8. Physical defects.

Due to Home Conditions: 1. Poverty causing malnutrition and necessity to work after school.
2. Bad environments at home or with associates.
3. Home cares and responsibility.
4. Ignorance and carelessness of parents.
5. Lack of control causing incorrigibility.

The Binet Test of Mentality.—The most practical tests are those devised by Binet, and translated into English by H. H. Goddard, of the Vineland Training School for Feeble-minded. These tests may be varied somewhat according to the originality of the examiner, and in order to obtain trustworthy results, he should bear in mind the following essentials: First gain the confidence of the child. Do not let him know you are quizzing him, but give the impression that you are playing with him. Try to find out something the child is interested in and draw some conclusions from his knowledge on that particular subject. It is not fair, for example, to ask an Italian who is but one year in this country to designate or pick from a number of coins a penny, nickel, dime, etc., and indicate which is of greater value. Common-sense on the part of the examiner with no previously formed opinion as to the mental capacity of the child will invariably net results. A vast store of patience, tact, and diplomacy is needed in making these examinations. Fear or distrust once established, makes it impossible to continue the examination.

The Binet-Simon Measuring Scale for Intelligence.—"Since we first translated and published our account of the Binet tests in January, 1910, a great stride has been made in the use and popularity of this measuring scale. We ourselves have tested the questions on four hundred feeble-minded

FIG. 68

Outfit for examining backward pupils.

children and on nearly two thousand normal children. The results have been published in the *Pedagogical Seminary*, September, 1910, and June, 1911.

"As the result of these studies we are able to make some suggestions as to desirable changes. It seems worth while to include these in the present edition of the tests.

"Experience with these tests has continually reassured us not only as to their value, but as to their amazing accuracy. Their usefulness as a means of understanding the mental development of children is beyond question, and we confidently believe that the time will speedily come when every child in school will be occasionally examined by some such method as this with a view of determining his actual mental development, and consequently what can be expected of him. This, not only for the purpose of segregating and giving special treatment to those who are backward or feeble-minded, but that we may know those who are especially well endowed and those who have average intelligence, so that each may receive the instruction that his condition requires.

"In the use of the Binet tests experience has emphasized two important dangers or liabilities to error. The one comes from the tendency of the optimistic, affectionate teacher examining a child from her own room to help too much and so credit the child with more than he himself can really do. The other is the opposite tendency of the teacher who either temperamentally or because of momentary conditions is not encouraging, but rather discouraging to the child, so that he does not do his best, and, consequently, does not get up to the standard of which he is really capable. *One should never begin the examination of the child with any preconceived notions as to what the child is going to do or how much he knows.* Do not credit a child with a question because you feel sure he could do it under other circumstances even though he fails now. The probabilities are very great that you are mistaken in your estimate and the present result is truer than your estimate.

"As a matter of technique, we find almost universally the best method of beginning these tests is to ask the child

to look at the pictures. This appeals to almost every child, and it also gives the examiner very quickly a clue to the grade of the child, especially after one has examined a few children and discovers how the different grades answer the question, 'What do you see here?'

"A needed caution here will also illustrate a point that applies to a great many of the questions, and that is the great care needed in asking the questions. The form of the question is very significant. For example, in showing the pictures, the examiner who says, 'What are they doing here?' herself answers the very question that we are supposed to determine from the child, namely, does he see the action? If you ask, 'What is he doing?' you compel him to see the action and he tells you, 'Mowing grass' or 'Cutting hair,' or whatever the picture may be. The question should always be in the form of 'What do you see here?' Not even 'What is this?' or 'What is that?' because that equally determines that the child sees a particular thing which again destroys the value of the test. And the same caution should be extended to many other questions.

"The form in which the question is asked is of vital importance. It is given correctly in the text here and should be followed very rigidly except in such cases as it is suggested that the form of expression may be simplified to meet the child's understanding.

"Professor Binet has published in the April, 1911, number of the *Bulletin de la Societé Libre Pour l'Etude Psychologique de l'Enfant* his latest revision of his measuring scale.

"His changes are of three kinds. First, there are the same number of questions for every age—except age five, where he still has only four. This will obviate a little difficulty that was met with in counting up a child's credits.

"Secondly, he has omitted some of the questions that were most dependent upon conscious training and education, such as the reading and writing tests.

"Thirdly, he has transposed some of the questions from one year to another with the idea of improving the scale. With these changes we cannot in every case agree.

"The results of our experience with the tests on four hundred feeble-minded and two thousand normal children convinces us that Binet's original scale was quite as correct as his new one, but that some improvement can be made in certain other questions."

It is perhaps necessary to remind anyone who is about to use the test that in securing responses from children, whether in word or deed, many more things are involved than the intelligence of the child. The attitude of the examiner is all-important. Some questioners do not inspire confidence. Then there is the child. Some children are timid or bashful. Lastly, there is the relation of the two. Always the child must be won. Sometimes it is easy, sometimes it is difficult. The questioner should be very tactful and careful until he sees that the child is at ease. Usually the whole examination can be referred to as a game and carried out in that spirit. At all events *get down to the level of the child.* Never tell a child his answer is wrong. Always encourage. Always tell him he has done well if he has done anything at all, and if he has done nothing pass it by as easily as possible. Some children if they have failed once and are made conscious of it, will not try again. On the other hand, do not insist that he respond, just because it seems to you that he must know how. He may not know. In other words, when a child fails to reply try to understand why, and act accordingly.

The following are the tests proposed by Binet and Simon

for each age from three to thirteen. If a child succeeds in the tests for his age he is normal. If he can succeed only in those given for a child a year younger than he, he is backward to the extent of one year, and similarly for two and three years. If he is more than three years backward he is mentally defective.

To allow for some unevenness in development, Binet finds it satisfactory to adopt the following conventions in estimating the results:

A subject has the mental development of the highest age for which he has succeeded in all the tests save one, *e. g.*, if he has succeeded in all but one test for nine years and all but one for ten, he is still credited with the intelligence of a ten-year-old child.

One more correction is necessary. Once a child's intellectual level is fixed, he is to be advanced a year for every five higher tests that he has succeeded in and two years for every ten tests that he succeeds in, *e. g.*, John is nine. He fails in two of the nine-year tests. We should thus class him as intellectually eight years old. But he has done three of the nine-year tests and three of the ten-year tests, making six in all. He is therefore advanced a grade and called normal.

This seems at first sight very artificial and too exact to be true, but Binet assures us that he has tested it very carefully and finds it amazingly accurate. We proceed with the tests.

Children of Three Years.—1. WHERE IS YOUR NOSE? YOUR EYES? YOUR MOUTH?

One of the best signs of awakening intelligence in young children is the comprehension of spoken words. We test this by asking these questions, which can be answered by a gesture.

2. Repetition of Sentences of Six Syllables.

It rains. I am hungry. (6 syllables).

Experiment proves that it is easier for a child to repeat words than to speak a word of his own. If a child does not respond one may try him with two syllables ("*mama*") then four, etc.

A child of three repeats six syllables but not ten. There must not be a single error.

3. Repetition of Figures. "6–4"

A child of three can repeat two figures. Figures require closer attention than words because they mean nothing to him. Pronounce the figures distinctly, one-half second apart and without emphasis on any one figure.

4. Describing Pictures.

A picture is shown to the child with the question. "*What do you see?*" The pictures must be chosen with some care. Each one must represent some *people* and *a situation.* Binet uses three pictures. The first is a man and a boy drawing a cart loaded with furniture. The second, a woman and an old man sitting on a bench in a park in winter. The third a man in prison looking out of the window; a couch, chair, and tables.

A child of three names the things—enumerates. He does not describe any actions in the pictures.

5. Name of the Family.

All children of three know their *first* name. They sometimes know the *family name but* not always.

Children of Four years.—1. Sex of Child. *Are you a little boy or a little girl?*

If testing a girl, give the question in this form. *Are you a girl or a boy?*

Children of three do not know. Children of four always do.

2. Naming Familiar Objects.

One takes from his pocket *a key, a knife,* and *a penny.*

The answers should indicate that the child knows what each is. This is a more difficult use of language than naming objects in the picture because there the child chose his own object to name; here we say, *"What is that thing?"*

3. Repetition of Three Figures. "7–2–9."

4. Comparison of Two Lines. *"Which is the longer line?"*

Draw two parallel lines three centimeters apart, the one 5 centimeters and the other 6. Hesitation is failure.

Children of Five Years.—1. Comparison of Two Weights. *"Which is the heavier?"*

Use weighted blocks of wood of equal size and appearance.

Compare 3 grams with 12 grams and 6 grams with 15 grams. Note the curious and interesting errors that are made.

2. Copying a Square.

Draw a square of 3 or 4 centimeters. Have child copy it with ink—not pencil. Pen makes it harder. It is satisfactory if one can recognize the square.

3. Repeats Sentence of 10 Syllables.

Use this: His name is John. He is a very good boy.

4. Counting Four Pennies.

Place four pennies in a row. Insist that child count them with his finger.

At three years a child does not know how to count four; at four half succeed; at five all succeed.

5. Game of Patience with Two Pieces.

Cut a visiting card diagonally. Place a whole card on the table. Nearer the child place the two pieces with the two hypotenuses away from each other. Ask the child to make a figure like the uncut card. One child in twelve fails.

Be careful (1) that child does not fail because he is too indolent to reach out and try; (2) that one of the pieces does not get turned over—because then it is impossible; (3) that you do not show by a look whether the child is right or wrong.

Children of Six Years.—1. Distinction between Morning and Afternoon. "*Is this morning or is it afternoon?*" It should be remembered that a certain type of child will always answer the *last* of two alternatives. Therefore if the time is afternoon, it is well to put the question, "*Is this afternoon or morning?*" Not before six do children know this.

2. Definition of Known Objects. "*What is a fork? a table? a chair? a horse? a mama?*"

There are three kinds of response. (1) Silence, simple repetition, or gesture, *e. g.*, "*A fork is a fork,*" or pointing say, "*That is a chair.*" (2) Definition in terms of use, "*A fork is to eat with.*" (3) Definitions *better* than by use. This includes all answers that describe the thing or even begin with "*it is a thing*"—"*it is an animal,*" etc., all of which expressions are not so child-like as the simple "*use*" definitions. In deciding which type of answer we shall credit to the child, we accept three out of five.

At four years half the children define by "*use;*" it increases a little at five and at six practically all define this way. Not before nine do the majority give the definitions that are "*better than by use.*"

3. Execution of Three Simultaneous Commissions. "*Do* you *see this key? Put it on that chair. Then shut the door. After that bring me the box that is on the chair. Remember, first the key on the chair, then close the door, then bring in the box. Do you understand? Well, then, go ahead.*" Such are the directions. They must all be done without

further help, hint, or suggestion. At four years almost none can do this; at five about half; at six all, or nearly all, succeed.

4. Right Hand, Left Ear.

One says to child "*Show me your right hand,*" and when that is done, "*Show me your left ear.*" There are, in the main, three kinds of response. (1) Does not know right and left. Shows right hand because of natural tendency. Shows right ear also. (2) Knows but is not sure. Shows right hand, then right ear, but corrects himself at once. (3) Knows and without hesitation touches right hand and left ear. (2) and (3) are considered satisfactory. If child touches one hand with the other in such a way that one cannot tell which hand he means, ask him to hold his right hand up high. Be very careful in this test to give no hint by look or word. At four years no child points to left ear; at five half of the children make a mistake; at six all succeed.

5. Esthetic Comparison.

"*Which is the prettier?*"

Binet uses six heads of women in three pairs, the one pretty and the other ugly or even deformed, Fig. 69. Care is taken that the pretty one is now at the left and now at the right. At six all choose correctly; at five about half.

Children of Seven Years.—1. Counting Thirteen Pennies.

Pennies must be placed in a row and counted with the finger. Finger must touch the piece at the same time that the child names the number. No piece must be counted twice and none omitted. The number thirteen must be given exact. At six years two-thirds fail; at seven they make no errors.

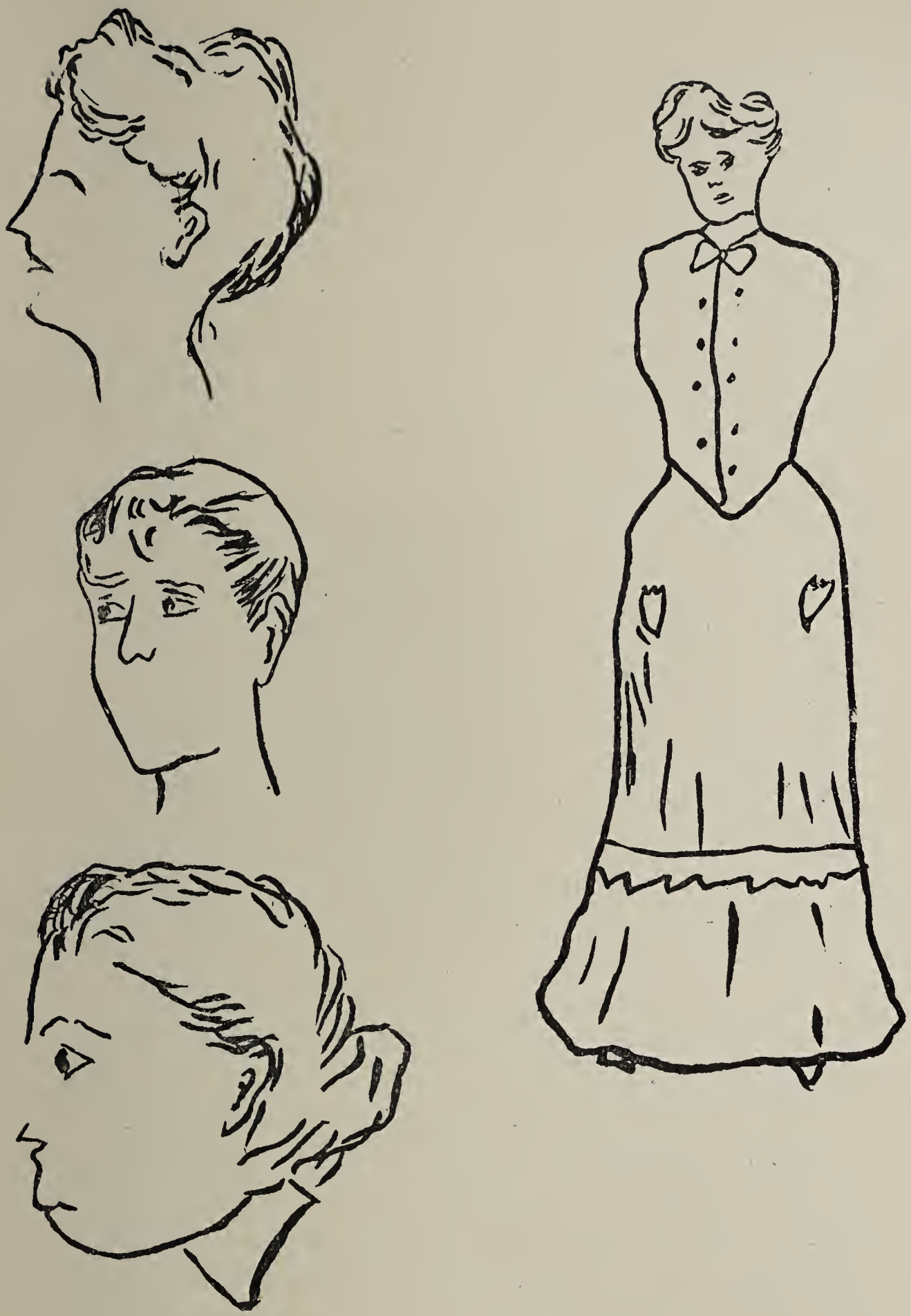
2. Description of Pictures.

Same picture as used in age three. Child now *describes* things instead of simply enumerating.

FIG. 69

Binet test, age six years. No. 5.

FIG. 70



Binet test, age seven years. No. 3.

3. Unfinished Pictures.

One shows four sketches of such as Fig. 70. Ask the child "*What is lacking in that picture?*" Child must answer three out of four correctly. At five years none are correct; at six errors number two-thirds; at seven the great majority are accurate.

4. Copying a Diamond.

Draw a rhombus about the size of the square used for age five. Have child copy this with pen. The result is satisfactory if it would be recognized as intended for a diamond-shaped figure.

5. Name Four Colors. Use red, blue, green, and yellow papers, in pieces about 1 x 3 inches. Touching each color with the finger ask, "*What is that color?*" It will be seen this is a test of color names not of discrimination. It should be done in 6 seconds.

Children of Eight Years.—1. Compare Two Things from Memory. "*What is the difference between a butterfly and a fly?* "*Wood and glass?*" "*Paper and pasteboard (or cloth)?*" The question may be differently put so as to make it intelligible as possible, *e. g.*, "*Why are they not alike?*" etc.

Two at least out of the three pairs should be answered correctly. If it takes more than two minutes it is a failure.

At six a third of the children do this test; at seven nearly all; at eight all.

2. Count Backward from 20 to 1.

This should be done within 20 seconds, and only one mistake allowed of omission or transposition.

3. The Days of the Week. These must be given in order without omission within ten seconds. Most persons would expect that this could be done before age nine, but it cannot.

4. Count Nine "Sous" (3 Singles and 3 Doubles). (Our two-cent piece is now so rare that we use 1-cent and 2-cent postage stamps.) Arrange in order, 1, 1, 1, 2, 2, 2, "*How much are they worth?* (*How much money to buy them?*) "*Count.*" It should be done within ten seconds without any error. There are three ways of counting. One child says 1, 2, 3, 5, 7, 9. Another says 1, 2, 3, 4–5, 6–7, 8–9. The third says, 1, 2, 3, 4, 5, 6, which is of course wrong. A large majority do this test at seven years. But all do it at eight.

5. Repetition of Five Figures. "4–7–3–9–5." Same method of procedure as given above, age three. Only three-fourths of the children succeed.

Children of Nine Years.—1. Make Change—9 Cents out of 25.

Play store, using real money. If child's cash consists of 25 pennies, 5 nickels, and 2 dimes, interesting degrees of intelligence will be discovered by noticing the coins he uses in making change. Child is storekeeper. One buys something that costs 9 cents. Child must actually give 16 cents as well as say it.

At seven no one can do this test; at eight a good third succeed; at nine all do it. See Revision.

2. Definition Better than by "Use."

This was explained under age six. At ages seven and eight, half the children give definitions of this kind. At nine they all do.

3. Name the Day of the Week, the Month, the Day of the Month and the Year.

The test is passed even if the day of the month is as much as three days wrong. Children least often know the year.

4. The Months of the Year.

Recited in order within fifteen seconds. Allow one omission or transposition.

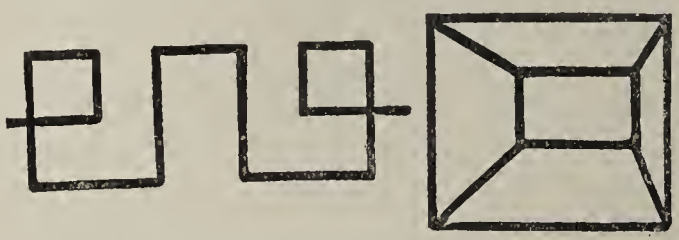
5. Arrangement of Weights.

Use five wooden cubes of same size and appearance, but loaded so as to weigh 6, 9, 12, 15, 18 grams. (Metal pill boxes may be used.) Place the five boxes on table in front of child and explain that they do not all weigh alike and he is to lift them one at a time and put them in order from the lightest to the heaviest. (The initial of each weight written on the bottom of each box makes it easy to see it they are right.) Record the exact order in which the child has placed them. Three trials are made. Two must be absolutely correct. The whole operation must not take over three minutes.

Children of Ten Years.—1. Naming Nine Pieces of Money. One may use cent, nickel, dime, quarter, half dollar, dollar, two dollars, five dollars, and ten dollars.

Pieces should be on table in a row but not in regular order of value. Point with finger, and name as he points.

2. Draw Design from Memory.



3. Repeats Six Figures. See Revision.

4. Questions of Comprehension. First Series.

What ought one to do:

1. When one has missed the train?

2. When one has been struck by a playmate who did not do it purposely?

3. When one has broken something that does not belong to one?

At seven and eight half respond correctly; at nine three-fourths; at ten all. If two questions out of three are answered correctly the test is passed.

Second Series.

What ought one to do.

1. When he is detained so that he will be late for school?

2. What ought one to do before taking part in an important affair?

3. Why does one excuse a wrong act committed in anger more easily than a wrong act committed without anger?

4. What should one do when asked his opinion of some one whom he knows only a little?

5. Why ought one to judge a person more by his acts than by his words?

Allow at least twenty seconds to each question. Three of the five must be answered correctly. At seven and eight no one responds to a majority of this second series; at ten half are successful; it is therefore a transition between ten and eleven years.

5. Using Three Words in a Sentence.

Binet uses the words *Paris, fortune, river.* We should say *Philadelphia, money, river.* This is the first time in these tests that we have required the child to "invent" his own expression. There are three forms of answers. (1) Three separate sentences. (2) Two ideas united by a conjunction. (3) A single idea involving the three words. Only the last two are satisfactory for the test. We allow one minute. At eight no one succeeds. At nine one-third, and at ten one-half get it right.

In this test may be seen a distinction between intelligence and judgment. Some children give a complete sentence with three words, but they do not make sense.

Children of Eleven Years.—1. Criticism of Sentences.

These are sentences that contain some absurdity or ridiculous expression. Binet explains that formerly he used sentences like "*Is snow red or black?*" but he found that

many bright children fell into the trap and others through confidence in the questioner failed to look for ân absurdity. Therefore he has changed the plan and now says to the child, "*I am going to give you some sentences in which there is nonsense. You listen carefully and see if you can tell me where the nonsense is.*" Then he reads the sentence very slowly.

These are the sentences:

1. *An unfortunate cyclist has had his head broken and is dead from the fall; they have taken him to the hospital and they do not think that he will recover.*

2. *I have three brothers, Paul, Ernest, and myself.*

3. *The police found yesterday the body of a young girl cut into eighteen pieces. They believe that she killed herself.*

4. *Yesterday there was an accident on the railroad. But it was not serious; the number of deaths is only* 48.

5. *Someone said, "If in a moment of despair I should commit suicide, I should not choose Friday, because Friday is an unlucky day and it would bring me ill luck."*

The test should last about two minutes. Three at least of the questions should receive good answers. At nine years hardly any child gets them; at ten scarcely a fourth; at eleven a half.

2. Three Words in a Sentence. (Given under age ten.)

At eleven all succeed.

3. Sixty Words in Three Minutes.

"*Say as many words as you can in three minutes;* as table, board, beard, shirt, carriage." We tell him that some children have named 200 words.

This test gives a splendid opportinity to appreciate the intelligence of a child. At least 60 words must be given.

4. Rhymes.

Explain what is meant by one word rhyming with another.

Illustrate. Then ask for as many words as the child can think of, that rhyme with a given word, *e. g.*, day or *spring* or *mill.*

One minute is allowed. Three rhymes with one word should be found in the given time.

5. Words to Put in Order. *"Make a sentence out of these words."*

Hour—for—we—early—at—park—an—started—the.

To—asked—paper—my—have—teacher—correct—the—I.

A—defends—dog—good—his—bravely—master.

Place the printed words before the child. He gives the sentence orally.

Time limit is one minute for each sentence. At least two must be given correctly.

Children of Twelve Years.—1. Repetition of Seven Figures. 2, 9, 4, 6, 3, 7, 5. 1, 6, 9, 5, 8, 4, 7. 9, 2, 8, 5, 1, 6, 4.

Tell the child there will be seven figures. Give three trials. One success is sufficient.

2. Abstract Definitions.

"What is Charity? Justice? Goodness?"

Two good definitions must be given. It is often somewhat difficult to decide if the definition is passable. If it contains the essential idea it must be accepted however badly it is expressed. At ten years a third succeed; at eleven they are generally successful.

3. Repetition of a Sentence of 26 Syllables. See Revision for new Sentence.

This should be done without error.

"Children, it is necessary to work very hard for a living. You must go every morning to your school."—24 syllables.

"The other day I saw in the street a pretty young dog. Little Maurice has got spots on his new apron."—26 syllables.

"Ernest is praised very often for his good conduct. I bought at the store a beautiful doll for my little sister."—28 syllables.

"There occurred on that night a frightful tempest with lightning. My comrade has taken cold. He has a fever and coughs very much."—30 syllables.

4. Resists Suggestions.

5. Problem of Various Facts. (*What is it?*)

"A person who was walking in the forest at Fontainebleau suddenly stopped much frightened and hastened to the nearest police and reported that he had seen hanging from the limb of a tree a————" (after a pause) *"what?"*

"My neighbor has been having strange visitors. He has received one after the other a physician, a lawyer, and a clergyman. What has happened at the house of my neighbor?"

Both questions should be answered correctly.

The answer to the first is *"a dead man."* Some object to this story as too gruesome. Others say that children are not so sensitive to such things as we think. Aside from that question it would seem that the picture is hardly familiar enough in America to make the answer certain. A substitute had better be found.

Children of Fifteen Years. See Revision. Adult.—1. Cutting Out.

Get the child's attention and let him see you fold a sheet of paper in four. Then with the scissors cut a small triangle from one edge—the edge which does not open. Ask him to draw a picture of the paper as it will look when unfolded. Do not unfold or allow another sheet to be folded. It is a difficult test. If a child does it the first time always ask him if he has seen it before.

2. The Reversed Triangle.

Cut a visiting card along the diagonal. Ask child to describe the resulting shape if one of the triangles was turned about and placed so that its short leg was on the other hypotenuse and its right angle at the smaller of the two acute angles.

3. Differences.

Ask the difference between

Pleasure and honor.
Evolution and revolution.
Event and advent.
Poverty and misery.
Pride and pretention.

4. Difference between President of a Republic and a King.

5. Gives Sense of a Selection Read to Him. See Revision for 4 and 5.

Such are the tests. In practice the examination should be conducted in a quiet place, the child being taken alone and as free from distractions as possible. The examination should not and need not last long enough to fatigue the child. Begin with the tests corresponding to the age of the child or below according as the child seems average or dull.

It is very desirable, when feasible, to have an assistant who records *verbatim* everything that the child says as well as makes notes on what he does during the examination. When this is impossible the examiner must keep his own notes, but care should be had that they be made as rapidly as possible, consistent with accuracy, so as not to keep the child waiting. This spoils the game. As said above, constantly encourage the child; continually tell him he is doing splendidly.

While examining the child forget all your preconceived

ideas. Regard him as an unknown quantity, an x which is to be determined.

Finally, these tests of Binet and Simon, while they seem to have been worked out with great care and are the result of large clinical experience so that they seem to be almost mathematically exact, yet they must be used with judgment and intelligence.

I believe they are the most valuable contribution yet made and in the hands of the reasonably intelligent teacher or parent will be found of great help in "measuring" the intelligence of the child and determining whether he is in need of special treatment. When such need is indicated even to a possibility he should be taken to an expert whose large experience with such children enables him to confirm the suspicion or to show why it was unfounded.

The reader who is at home with French should read the original article of Binet and Simon, *L'Anne Psychologique,* 1908, part of which we have here condensed. The rest of the article containing discussions and suggestions we hope to resume at another time.

The Revision.—In the following list we give an arrangement which embodies our experience while following Binet's new order as closely as we can.

We believe that for American children, at least, this scale is about as accurate as it can be made.

Attention should perhaps be called to the fact that this revision does not at all imply that the results obtained with the old one were wrong. The method of counting devised by Binet was so accurate that it enabled the examiner to do the child justice even if a few questions were misplaced. The new scale will simply be more convenient because it will obviate straggling; that is, where a child, for example, stops at seven years, but gets enough credits to make him

eight, some of these credits coming from nine and some from ten. The tendency under the new scale will be to answer the eight-year questions and stop there, doing none in nine or ten. Undoubtedly this will not always be the case, but it will occur oftener than with the old scale.

The following are the questions as we now use them:

No Change

III

1 Points to nose, eyes, mouth.
2 Repeats "It rains. I am hungry."
3 Repeats 7, 2.
4 Sees in Picture 1.
2.
3.
4.
5.
5 Knows name.

IV

1 Knows sex, boy or girl (girl or boy).
2 Recognizes key, knife, penny.
3 Repeats 7, 4, 8.
4 Compares lines.

Binet new.	Binet old.			
			V	
1	1	1	Compares 3 and 12 grams; 6 and 15 .	32– 2
2	2	2	Copies square	23–11
3	(new)	3	Repeats: His name is John. He is a very good boy	new
4	4	4	Counts four pennies	30– 4
5	3	5	"Patience"	20–12
			VI	
1	7	1	Morning or afternoon	30–12
2	4	2	Defines fork, table, chair, horse, mama	35– 6
VII 3	5	3	Puts key on chair, brings box, shuts door	25– 7
VII 1	1	4	Shows right hand, left ear	35– 8
5	3	5	Chooses prettier	31– 9
			VII	
VI 4	7	1	Counts 13 pennies	94– 5
2	6	2	Describes pictures	83–25
VIII 3	1	3	Sees picture lacks eyes, etc.	87– 9
VI 3	4	4	Can copy diamond	95– 8
5	VIII 3	5	Names colors, red, blue, green, yellow .	97– 5

			VIII	
1	6	1	Compares two objects from memory, butterfly, fly: wood, glass, paper, cloth .	87– 2
2	4	2	Counts backward 20 to 1	90–91
omitted	IX 2	3	Repeats days of week	85– 4
VII 4	2	4	Counts stamps 111222	79–14
5	VII 5	5	Repeats 5 figures	36– 7
			IX	
1	3	1	Makes change, 20c, 4c	33–23
2	4	2	Definitions better than use	45–27
VIII 4	1	3	Knows date	48– 7
4	XI	4	Repeats months in order	48– 6
XI	6	5	Arranges 5 weights	44–11
			X	
IX 3	2	1	Knows money 1c, 5c, 10c, 25c, 50c, $1, $2, $5, $10	104– 5
—	new	3	Repeats six figures: 854726, 274681, 941-738	new
2	new	2	Draw design from memory (show 10 sec.)	new
4	4	4	Comprehends easy questions . . .	98– 8
5	3	5	Uses 3 words in two sentences . . .	92–17
			XI	
X 3	1	1	Sees absurdity; painter, brothers, locked in room, railroad accident, suicide .	48– 4
XII 2	2	2	Uses 3 words in a single sentence . .	39–14
XII 3	3	3	Gives 60 words in three minutes . .	35– 3
XV 2	2	4	Gives three rhymes	45– 5
XII 5	5	5	Puts dissected sentences together . .	35– 9
			XII	
XV 1	1	1	Repeats 7 figures	37– 7
XII 4	X 4	2	Defines charity, justice, goodness . .	5– 0
	3 revised	3	Repeats sentence of 26 syllables . .	15–21
1	new	4	Resists suggestion	new
XV 5	4	5	Problems: (*a*) Hanging from limb . . (*b*) Neighbors, visitors . .	40– 3
			XV	
1		1	Interprets picture.	
		2	Change hands of clock.	
		3	Code.	
		4	Opposition.	
			ADULT	
1	XIII 1	1	Cutting paper.	
2	XIII 2	2	Reversed triangle.	
3	XIII 3	3	Gives differences of abstract words.	
4	new	4	Difference between president of a republic and a king.	
5	new	5	Gives sense of a selection read to him.	

All questions under any age must be answered to pass that age—instead of all but one as in the old scale.

Explanation of the Revised Binet Scale.—The names of the tests are abbreviated, but will be understood by reference to the old list. The new questions are explained below.

The number of the question, as it was in the old list, is given immediately before the present number. The first number in the line shows the place of the question in Binet's revised scale, *e. g.*, VIII 3 (repeat days of week), was IX 2 in old scale, and Binet omits it entirely from his new scale. Following each question we give the successes (first figures) and failures (last figures) on the question by normal children, as obtained from our examination of two thousand normal children. (See *Pedagogical Seminary*, June, 1911.) For example, in V 1, 32 succeeded and 2 failed.

IX. 1. *Our* old form was too hard. We propose now, 20c.—4c., and give the child two dimes. This is Binet's form, but he has a 20-cent piece, which we lack. However, two dimes will probably do as well.

IX. 2. At Vineland we have been a little too strict on this question. We now propose to accept any definition that is more than simply "use," *e. g.*, chair has four legs, table is made of wood, etc.

X. 2. Use this design. Expose 10 seconds. Have child draw his design on back of record sheet. (This should be considered satisfactory as one who did not know just what the design was would recognize it. No account is taken of proportions or crookedness of lines or perspective. It is well to remind the child before beginning that he is to draw both parts.) "Tests attention, visual memory, and a little analysis."

XI. 4. There should be three rhymes with each of three words. The fourth word is intended to be used as an illustration, the examiner giving rhymes for that.

XI. 5. In the dissected sentence, the second one which has the word "have" in it, proves to be the most difficult. However, since the test is passed if two are correct, the other two will give the child a fair chance.

XII. 3. Old sentence too hard. Use the following: I saw in the street a pretty little dog. He had curly brown hair, short legs, and a long tail.

THE FOLLOWING QUESTIONS WERE NOT IN THE OLD LIST:

XII. 4. Binet's description of this test is as follows:

Prepare a little booklet of six pages. On first page draw in ink two lines horizontal; the one to the left 2 inches (4cm.) long, the one to the right $2\frac{1}{2}$ inches. On second page, left line is $2\frac{1}{2}$, right, 3 inches. Third page, left line 3 and right one $3\frac{1}{2}$ inches. On three remaining pages all lines are $3\frac{1}{2}$ inches long. The lines on each page are in same straight line and separated by $\frac{1}{2}$ inch.

The idea of the test is this: Child having said the right-hand one is longer for three times, will he continue even when he comes to those that are alike or will he "resist the suggestion" and say they are alike?

Care must be exercised in asking the question. For the first two pages ask, "Which is the longer line?" but for the others say merely, "And there?"

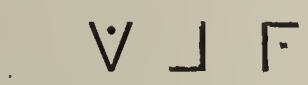
XV. 1. Use same pictures as in III 4 and VII 2. The test is credited in XV if subject "*interprets*" the feeling of the picture—usually expressed by some word of sympathy, fear, sorrow, joy, or other feeling.

XV. 2. Interchange the hands of a clock for (1) the hour 6.20 and (2) 2.56. (Child must not see a watch or clock.

It is a test of imaging power.) We say to the child, "Can you think how the clock looks when it is twenty minutes past six (four minutes before three)? Well, now tell me what time the clock would show if I changed the hands, putting the long hand where the short hand is and short hand where long hand is?"

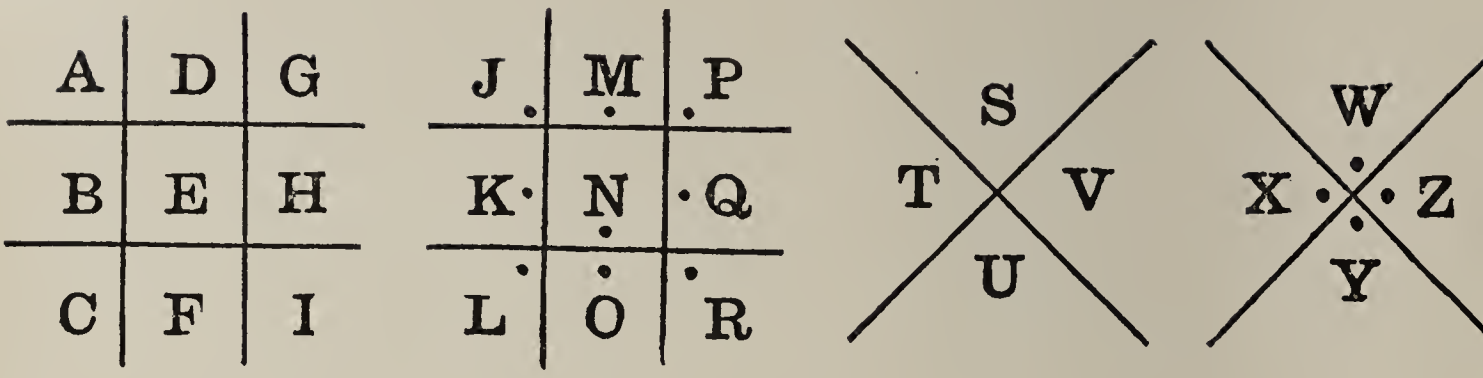
XV. 3. This test was suggested by Dr. William Healy, of Chicago. It was used by the Southern army in the Civil War.

The diagrams shown below are to be constructed while the child gives close attention. He notes the arrangement of the letters, in alphabetical order vertically in first and second, and counter-clockwise in the third and fourth diagram. Two and four differ from one and three in having a dot in each section. Once knowing the scheme, the letters may be left out and a cipher dispatch written by using for each letter the part of the diagram in which the letter is placed in the key. For example "war" would be written:



Having made it perfectly clear, remove the key and have child write on back of record sheet, "Caught a spy," in this code. In crediting allow one error. Every wrong or incomplete symbol is an error.

It should be remembered that this is to be very carefully explained to the child. He is allowed to look at the diagrams, and it should be illustrated, but after the test begins the child should not draw the diagrams for himself. He should work out the code simply from memorizing. He may count up on his fingers and find out where the letter would be, but he must not write down the diagram.



XV. 4. Ask child to write the opposites of the following words: 1, good; 2, outside, 3, quick; 4, tall; 5, big; 6, loud; 7, white; 8, light; 9, happy; 10, false; 11, like; 12, rich; 13, sick; 14, glad; 15, thin; 16, empty; 17, war; 18, many; 19, above; 20, friend.

Illustrate. One may say, "Tell me just exactly what this word does *not* mean," or "If a child is not good, what is he?" But this latter should not be repeated with each word, only once or twice as illustrations; then the child should give the opposites after that. If he is unable to do this, his very lack of comprehension is sufficient evidence that he cannot pass the test.

Besides the obvious answers, the following are accepted as right or half right:

2, in or indoors (half); 3, lazy or slowly (half); 4, little or low (half); 5, short (half); 6, soft or low (right), whisper (half); 9, sorry or sorrow (half); 10, right or truth (half); 11, dislike, unlike or hate (right); 13, healthy (right); 14, mad (right); 15, broad (half); 16, filled (right); 18, none (right); 19, under (right).

It is best to have the words printed on a slip of paper in vertical column, with space for child to write the "opposite" at the right.

The equivalent of 17 correct answers must be given.

"ADULT."[1]—Adult 4. Say to the subject: "There are three differences between the President of a Republic and a King. What are they?"

The answer should contain the three ideas, Royalty is (1) hereditary, (2) lasts for life, and (3) the monarch has extended powers. The President is (1) elected, (2) for a definite time, and (3) his powers are usually less extensive than those of a king.

Adult 5. Explain to the subject that you are about to read a selection to him, and that then you will ask him to tell you the substance of what you have read. He should give close attention.

Read slowly, in a clear voice and with expression, the following:

"One hears very different judgments on the value of life. Some say it is good, others say it is bad. It would be more correct to say that it is mediocre; because on the one hand it brings us less happiness than we want, while on the other hand the misfortunes it brings are less than others wish for us. It is the mediocrity of life that makes it endurable; or, still more, that keeps it from being positively unjust."

It is correct if the subject gives the central thought in his own words, *e. g.*, "Life is neither good nor bad, but mediocre, because it is inferior to what we wish and not as bad as others wish for us."

The tests for "XV" and "adult" are new, and we shall be glad to receive any comments or the results of any use of them. We have concluded that adult 1 and 2 test special traits rather than universal, *e. g.*, we found in a mixed group of educators and scientists, six out of twenty succeeded

[1] Binet explains that the word adult is not to be understood literally. It can only mean "over fifteen years."

with No. 1. In another group, psychologists, twelve out of eighteen succeeded.

The great need just now is to get suitable test up to age twenty. Perhaps there are no better ones than the tests of experience, and we may some day conclude that the boy or girl who has had an opportunity, and has not conformed to the canons of civilized society, is fundamentally defective in the qualities necessary to a useful citizen.

Alternative Questions.—It sometimes happens that one wishes to test a child a second time, a few weeks after an earlier test. There is some fear that he may have remembered the questions or have been coached in his answers. In such cases an alternative set of questions is convenient.

Many of the questions need no substitute, *e. g.*, one cannot "learn" to arrange the five weights. If he cannot do it no amount of coaching will help him.

In other cases possible variants are so obvious that we leave them to the user. However, it is not always as easy as it looks, and he must be very careful or he will introduce changes seemingly small, yet which either change the difficulty radically or change the test utterly.

The following suggestions may prove helpful:

V. 3. Repeat "Little Mary likes to play with her dolls."

VI. 2. Define spoon, bed, drum, cow, father.

VI. 4. Show left hand, right ear.

VIII. 1. Difference between horse and cow, stone and egg, grass and tree.

VIII. 3. Name days of week backward. Allow more time.

IX. 4. Give months backward. Allow more time.

X. 2. Use design upside down or turned at 90 degrees.

X. 4. Comprehension. Use any of the following:

1. What ought one to do when he is sleepy?
2. When he is cold?
3. When he sees that it is raining just as he is about to go for a walk?
4. When one is tired and a long way from home?
5. Why is it necessary to save one's money and not spend it all?
6. What ought one to do when he has received punishment that he did not deserve?
7. What should one do to get a watch that he wants at store?
8. What should one do when some one has offended him and comes and asks pardon?
9. What happens when two persons discuss a question without understanding the words?
10. What should you do when a person always contradicts you, no matter what you say?
11. Why is it better to persevere in what one has begun than to give it up to try something new?
12. Why should one not taunt a person of the service one has done him?
13. What ought one to do who has done an irreparable wrong?

X. 5. Use the words *snow, play, sled.*

XI. 1. Use any of the following:

XI. 1. Do you see any absurdity in the following?

1. I like the end slices of bread. I gave the girl a whole loaf of bread and told her to bring me the two end slices. I afterward found that she had sliced the entire loaf. I asked her why she did this. She said, "How could I get the second end piece unless I did?"
2. A man asked a boy where Mr. Smith lived, he said, "The first house you come to is a barn and the next is a haystack. The next is Mr. Smith's."
3. A man said to his friend, "May you live to eat the chickens that scratch sand on your grave."
4. A man came to see Prof. Johnstone; Prof. Johnstone was not at home. I asked him his name. He said, "Oh, it is not necessary to leave my name; Prof. Johnstone knows me."
5. A gentleman fell from his carriage and broke his neck, but received no further damage.
6. I received a letter from a friend in which he said, "If you don't get this letter just let me know and I'll write again."
7. I read in a paper that they fired two shots at a man. The first shot killed him, but the second didn't.
8. The judge said to the prisoner, "You are to be hanged, and I hope it will be a warning to you."

XI. 4. Rhymes use *man, toy, cold.*

XI. 5. DAY — IT—WE—PICNIC — THE—OUR—
RAINED—HAD.
IF — ASKED—BALL—MY—HAVE—WE—
MOTHER—PLAY—I—MAY.
A — MAKES—BOY—GOOD—HIS—HAPPY
—MOTHER.

XII. 2. Defines *truth, mercy, pity.*

XII. 3. Repeat, "Mary is often praised for her very nice, neat work. She is always a good little girl, and likes to sew."

XII. 5. (*a*) A man walking in the woods began to be worried. He looked to right and left. He walked back and forth. He climbed a tall tree.

"What was the matter?" The answer is, of course, he lost his way.

(*b*) I saw a crowd going along the street. They were all dressed up and each had a basket or a bundle.

"Where were they going?" Answer, a picnic or excursion.

XV. 3. The code may be easily changed by changing the arrangement of the letters from vertical to horizontal, counter-clockwise to clockwise, etc.

XV. 4. Other lists may be made up.

Some may desire to use the reading test, although Binet omits it from the new list. The following selection is a little easier than the old one and we suggest it as a nine-year test. In our Vineland study the reading was passed at eight years in the ratio of forty-nine—thirty-three and at nine years in the ratio of forty-eight—seven.

NEW YORK, JUNE 5.

A big flood at Cape May swept away five boats full of fish. A little boy, the son of a fisherman, was carried out to sea.

While trying to save him a man in a row boat was washed overboard and nearly drowned. The child was saved.

Name Born Admitted

III

1 Points to nose, eyes, mouth.
2 Repeats "It rains. I am hungry."
3 Repeats 7 2.
4 Sees in Picture 1. 4.
(Enumerates) 2. 5.
3. 6.
5 Knows name.

IV

1 Knows sex, boy or girl, (girl or boy).
2 Recognizes key, knife, penny.
3 Repeats 7, 4, 8.
4 Compares lines.

V

1 Compares 3 and 12 grams. 6 and 15 grams.
2 Copies square. (Draw on back of this sheet.)
3 Repeats, "His name is John. He is a very good boy."
4 Counts four pennies.
5 "Patience."

VI

1 Morning or afternoon. (afternoon or morning)
2 Defines fork horse
table mama
chair
3 Puts key on chair; shuts door; brings box.
4 Shows R. Hand. L. Ear.
5 Chooses prettier 1 and 2. 4 and 3. 5 and 6.

VII

1 Counts 13 pennies.
2 Describes pictures. (Action.) (See III 4.)
3 Sees picture lacks eyes, nose, mouth, arms.
4 Copies diamond. (over).
5 Recognizes red, blue, green, yellow. (Time 6″.)

VIII

1 Compares (Time 20″.)
Butterfly Wood Paper
Fly Glass Cloth
2 Counts backward 20 to 1. (Time 20″.)
3 Repeats days. M. T. W. T. F. S. S. (Time 10″.)
4 Counts stamps. 111222. (Time 10″.)
5 Repeats 4 7 3 9 5.

IX

1 Makes change 20c—4c.
2 Definitions (see VI 2).
3 Knows date.
4 Months. J. F. M. A. M. J. J. A. S. O. N. D. (Time 15″.)
5 Arranges weights. (2 correct) (1 min. each). 1. 2. 3.

Record Blank
For Revised Binet Tests

Examined Mental Age

X

1 Money 1c, 5c, 10c, 25c, 50c, $1, $2, $5, $10.
2 Draws design from memory. (Show 10 seconds.)
3 Repeats 8 5 4 7 2 6. 2 7 4 6 8 1. 9 4 1 7 3 8. (1 out of 3 correct)
4 Comprehends.

(1st Series time 20″) (2 out of 3)	(2d series time 20″). (3 out of 5)
a. (Missed train)	*a.* (Late to school)
b. (Struck by playmate, etc.)	*b.* (Important affair)
c. (Broken something)	*c.* (Forgive easier)
	d. (Asked opinion)
	e. (Actions vs. words)

5 Sentence: Philadelphia, Money, River. (Time 1″)

XI

1 Sees absurdity. (3 out of 5) (Time 2′)
a. Unfortunate painter. *d.* R. R. accident.
b. Three brothers. *e.* Suicide.
c. Locked in room.
2 Sentence: Philadelphia, Money, River. (See X 5.)
3 Gives sixty words in three minutes. (Record on back of this sheet).
4 Rhymes (time 1′ each) (3 rhymes with each word) (All correct)
day mill
spring
5 Puts dissected sentences together. (Time 1′ each) (2 out of 3 correct)
a. *b.* *c.*

XII

1 Repeats 2 9 6 4 3 7 5. 9 2 8 5 1 6 4. 1 3 9 5 8 4 7. (1 out of 3 correct)
2 Defines Charity
Justice
Goodness
3 Repeats, "I saw in the street a pretty little dog. He had curly brown hair, short legs, and a long tail."
4 Resists suggestion (lines). 1. 2. 3. 4. 5. 6.
5 Problems: (*a*) Hanging from limb. (*b*) Neighbor's visitors.

XV

1 Interprets picture.
2 Changes clock hands. (*a*) Twenty minutes past six. (*b*) Four minutes of three.
3 Code. COME QUICKLY.
4 Opposites. (The equivalent of 17 out of 20)

1	good	5	big	9	happy	13	sick	17	war
2	outside	6	loud	10	false	14	glad	18	many
3	quick	7	white	11	like	15	thin	19	above
4	tall	8	light	12	rich	16	empty	20	friend

Adult

1 Cutting paper. (Draw)
2 Reversed triangle. (Draw)
3 Gives differences of abstract words.
4 Differences between president of a republic and a king.
5 Gives sense of a selection read.

Department of Research
Training School at Vineland, N. J.

TREATMENT OF THE MENTAL DEFECTIVE, SUBNORMAL, OR RETARDED CHILD.

The true mental defective, or those in whom there are defects of brain with total or almost total lack of function of this organ are not subjects for training in public schools. They should be institutional cases where life and training is mapped out along scientific lines.

In the case of the subnormal, dull, and retarded child a thorough investigation should be made for the possible underlying causes of the defect and the proper treatment instituted. Where any defect has been located, whether in the school system, the home, or the child, every effort must be made to correct these defects.

First, place the school, its system, and its teachers in the best possible position to care for and train the child. Study the teacher and her methods, her health, and temperament. Find out why in certain branches the child excels and in others fails. Study some pedagogical method of increasing interest in dull subjects. Individual interest and encouragement by a teacher often leads a seemingly dull boy to a higher standard. His weak points should not be dwelt upon, but his good points encouraged. Human nature asserts itself chiefly in childhood, he is then most amenable to kindness.

Home conditions when at fault can often be corrected by visits and friendly, tactful advice from the nurse, teacher, or social visitor. In cases of poverty call freely for aid from the various philanthropic organizations at your command. An interested enthusiastic person will always find a solution for the many faulty conditions that may be found at the homes.

Physical defects when found should always be corrected whether or not they seem to contribute to the mental dulness. It is not necessarily true that all children with physical defects are subnormal mentally, but certain defects, especially of the eyes and ears, are sure to handicap a child in its progress.

Dr. L. Wessels, ophthalmologist for the schools of Philadelphia, submits the following interesting study of 5000 school children examined under a mydriatic for defective vision. Using age and grade as a factor of mentality, he concludes that 75 per cent. of these children are backward.

There are many interesting features connected with this table that are worthy of study.

One thousand one hundred and seventy, or 23 per cent., were in the average grades, and only 281, or 5 per cent., were above the average grades.

The majority of the children were below the fourth grade.

Four thousand two hundred and ninety-seven, or over 83 per cent., were below the fifth grade.

Only 1909, or 37 per cent., were above the third grade.

Only 849, or 16.5 per cent., were above the fourth grade.

Only 297, or 5.75 per cent., were above the fifth grade.

Only 92, or 1.78 per cent., were above the sixth grade.

Only 33, or 0.64 per cent., were above the seventh grade.

Note among other things in the table that the number of pupils suddenly drops around the age of fourteen, the legal age at which children are permitted to work. Out of 285 children fourteen years old, 273, or about 97 per cent., were backward; the majority were below the fifth grade.

These figures seem to indicate that most of these children leave school before they reach the fourth grade, or that the children in the higher grades have better vision or have their defects corrected with glasses.

AGE OF PUPILS.

Grade	6	7	8	9	10	11	12	13	14	15	16	Total	Above normal Average age
8th								8	12	7	6	33	13 or 40%
7th							7	21	20	10	1	59	31 or 53%
6th					1	16	54	82	39	10	3	205	134 or 65%
5th				1	39	112	183	141	55	21	0	552	400 or 72%
4th				56	196	235	264	224	69	15	1	1060	808 or 76%
3d		1	83	213	291	279	227	135	47	17	1	1294	997 or 77%
2d	1	68	246	278	276	150	110	62	36	8	1	1236	921 or 74%
1st	134	186	160	90	60	37	19	11	7	1	6	707	391 or 55%
Total	135	251	489	638	863	829	864	684	285	89	19	5146	3695 or 72%
Above normal Average age			160	368	627	701	803	655	273	89	19	3695	
Per cent.			32%	57%	73%	85%	93%	96%	97%	100%	100%	72%	

Figures on the broken lines represent the positions of the normal average school child.

This investigation teaches the importance of detecting and correcting defective vision in children in the lower grades, as the early correction of these defects enables the the child to reach a higher grade and insures a better education when he reaches the quitting age of fourteen. Furthermore, if less children are left behind in the lower grades, it will help to eliminate the overcrowding that exists in these grades.

Children's eyes should be examined before they enter school. If this is not possible, the medical inspector should devote most of his time to examining the eyes of children in the kindergartens and first grades, as the correction of many grave visual defects then will greatly promote the future progress and usefulness of the school child and future citizen.

In backward children it is a great advantage to have the medical examinations of the eyes, ears, nose, and throat made by specialists in these branches of medicine In large cities special clinics for school children should be held in these specialties in connection with systems of medical inspection.

Special Schools and Special Classes.—Special schools should be of two classes: 1. Parental for the instruction of incorrigible and truant children.

2. Special schools for the instruction of the backward child not a mental defective, imbecile, or idiot.

Parental schools, as the name implies, take the place of the parents and supply the home discipline which is lacking. Care must be exercised that the good accomplished in these schools is not counterbalanced by home conditions.

Special schools are for the training of children as individuals and not in large groups. The curriculum is made to suit the individual child and the classes are small enough to admit of the teacher giving personal instruction. Equip-

ment and courses of study are arranged to suit the capabilities and interest of the children, and the teaching is performed by specially trained teachers.

Special classes should be instituted in all large schools to instruct the child who is not dull or backward, but requires extra time and individual instruction to bring him up to the standard of the other pupils of his class. This may include pupils who fail in one or two subjects. These classes also should be supervised by specially trained teachers.

Specially qualified or trained teachers for special schools and classes: The applicants for these positions should be closely studied as to their temperament and disposition. Kindness, gentleness, and an excess of patience are required, and an excellent training for such a position may be obtained at one of the institutions for feeble-minded children. In the State of New Jersey, near Philadelphia, is the New Jersey Training School for Feeble-minded at Vineland. This is an ideal institution, giving a special summer course for those desiring to take up this line of work. In Philadelphia at the University of Pennsylvania there is also a summer course to train special teachers.

The normal schools and schools of pedagogy in other large cities should also establish such courses and train teachers to fill these positions. Because of the additional qualifications and training required of teachers of special classes, they should receive a greater compensation than the ordinary teacher, thereby inducing teachers to qualify for these positions.

Institutions for Feeble-minded and Backward Children.— The need of these institutions requires no argument, and that there are too few in existence is evident. These institutions should not only care for the children intrusted to

them, but should utilize these cases for study and advancement of the subject. Teachers and others desiring training should be able to obtain it at moderate cost. The board of managers, resident, and visiting staff should consist of physicians trained in diseases of the nervous system and mentality as well as prominent psychologists and pedagogists.

The following short description of the Training School at Vineland, New Jersey, will give some idea of a typical well-regulated institution.

At Vineland, New Jersey, about one hour's ride from Philadelphia, is an institution with over four hundred feeble-minded who are cared for, treated, and educated by the most modern methods known. With over two hundred and fifty acres of farm land there is ample opportunity to have fresh air and utilize some of the grounds for teaching gardening.

Of no small importance is the use of this great amount of valuable material for a summer school for teachers of backward or mentally deficient children. Lectures during a period of six weeks are supplemented by study and observation of the children in the class-rooms. Men prominent in the pedagogical and medical world take part in the lectures.

There is a completely equipped laboratory at the institution for the scientific study of the cases.

Clinics and Laboratories.—Psychological clinics and laboratories are of value in the study of causes and treatment of mental deficiency and backwardness. They should be established in every large University and College which offers courses in pedagogy, and could be established with advantage in connection with normal schools. Material can readily be obtained or referred from the public schools. The equipment should include modern apparatus for the physical and mental examination of applicants.

MEDICAL INSPECTIONS BY TEACHERS OR NURSES.

While the ideal system and best results are obtained by trained physicians as school inspectors, it is not absolutely necessary for the conduct of such work. If lack of funds or other cause prevents the employment of physicians, the routine inspections may be made by nurses or teachers. They, however, should not endeavor to make an absolute diagnosis or prescribe treatment. In all towns there are to be found some public-spirited physicians who can be interested in the undertaking, and will volunteer to examine children sent to them, and even make an occasional visit to the school. In a community where no physician is employed one of these volunteers should be called on for cases requiring diagnosis and treatment. Many of the gross physical defects can be detected by the teacher. She can test vision and hearing according to the instructions given in the chapters of this book, and as a condensed guide the procedure may be conducted as follows:

When examining the eyes, use the test card placed in proper lighting—20 feet distant. If the child shows normal vision and still has headaches and other symptoms referable to eye-strain, insist on a thorough examination by a competent ophthalmologist.

In testing hearing use the whispered voice test. Stand the child about 20 feet distant away from an open door or window. With the child facing the wall so he may not watch the movement of the examiner's lips, and while one ear of the child is closed, whisper words for him to repeat.

The nose and throat can be examined only by a physician. The teacher can label a child as a "mouth breather" or "nasal obstruction," and leave the diagnosis of adenoids or enlarged tonsils to the doctor.

Skin lesions are numerous and difficult for a layman to diagnosticate. By assuming this responsibility what may seem as only "pimples" or "eczema" or "stomach rash" may be measles, chickenpox, smallpox, or other contagion.

Carious teeth or unhealthy condition of mouth are readily recognized and can be referred to a dentist.

Marked orthopedic defects can also be recognized by the teacher. Diseases of the nervous system and systemic diseases can merely be suspected and expert opinion should be obtained.

The prevention of epidemics of contagious diseases, one of the most important functions of medical inspection, can be well controlled by the teachers.

Each morning before beginning the lessons have a classroom inspection. The teacher asks the class to rise at the right hand side of the desks; extend arms in front of body and hold heads erect. The teacher takes her position by a window with her back to the light, and the children pass in front of her in single file returning to their seats. This entire procedure for a class of thirty or forty should take a little over five minutes.

With note paper and pencil she notes uncleanliness, any rash on face or hands, redness or watering of eyes, swelling on face or neck, neck bandaged (sore throat), scaling or peeling of hands, cough, running of nose, and discharge from ears.

Exclude every child with a rash and fever; every child with any symptoms of a sore throat; every child who vomits in school, as scarlet fever often begins with it.

An excluded child for a suspicious contagious disease should not be returned to its class until it presents a certificate from a physician stating it is free from any contagious disease.

Teachers may be guided as to the conditions requiring attention by reference to the following:

Symptoms of Fever in General.—Headache, lassitude, languid expression of eyes, sometimes flushed cheeks, at other times pallor; heat of skin and rapidity of pulse.

FIG. 71

Class-room inspection.

Early Symptoms of Measles.—The earliest symptoms are those of a cold. There is feverishness, eyes are reddened, watery, and sensitive to light; there is a discharge from the nose and the patient sneezes and coughs, the cough being of

a dry, high-pitched character. These symptoms often last for three days before the rash comes out. Later a blotchy rash appears on the face, neck, and body. The disease is highly contagious even at an early stage.

Scarlet Fever.—Scarlatina is ushered in usually by vomiting, although this may be absent. The throat is often sore from the beginning. There are the usual symptoms of fever. On the second day a red rash appears all over the body, the cheeks are flushed but the lips and chin are pale.

Patients convalescent from an unsuspected scarlet fever returning to school prematurely may exhibit scaling hands, discharging ears, enlarged glands at angle of jaws, and prominent red elevations upon the tongue.

Diphtheria.—The symptoms of diphtheria are those of fever and sore throat. There may be discharge and bleeding from the nose.

Mumps.—In mumps there is a painful swelling on one or both sides of the face in front of the ear.

Whooping Cough.—In whooping cough the patient has an ordinary cough for a few weeks, then a characteristic cough sets in which discloses the nature of the disease. It comes on in distinct spells, during which the face is puffed and reddened, the eyes congested and watery, and a loud whooping sound is made; sometimes the paroxysm is followed by vomiting.

Teachers can do most for the physical welfare of their pupils by teaching practical hygiene. Anatomy and physiology should be made interesting by practical lessons on healthy living. Stories which bring in lessons of hygiene appeal to the child and leave an impression. Rewards offered for periods of cleanliness are incentives to keep clean. Physicians should be invited occasionally to give health talks and if at convenient times of day, the parents can be

invited to such meetings. These give excellent opportunities to discuss public health problems which advertise and accomplish many valuable reforms for a town.

Teachers should always be well acquainted with the sanitary conditions of their school houses and urge the abating of all nuisances or things prejudicial to the health of their scholars.

Keeping of Records.—It is valuable for the teacher to keep a permanent record of the physical condition of her pupils. Such records should be kept on the back of the attendance or school report cards, and should be transferred from room to room or school to school with the child. Such record should include date of examination, condition of eyes, ears, nose and throat, other defects, and the date and character of any sickness during term. This admits of a ready comparison of physical defects, standing in class, and progress in school. Many cases of non-promotion can be traced by the information on these reports.

CIVIL SERVICE AND COMPETITIVE EXAMINATIONS FOR POSITIONS OF SCHOOL MEDICAL INSPECTOR.

Several cities that have medical school officers and examiners have appointed them from eligible lists on results of examinations. There can be little dispute as to whether more efficient men are obtained in this manner. If the examination is practical, consisting of questions pertaining to the position to be filled and the examiners are unaware of whose papers are being marked, the results should be satisfactory. Men who have served provisionally in such appointments have an advantage insofar as knowing the practical work. True civil service eliminates politics and

favoritism. A man may be coached for an examination by someone familiar with the work, and thus pass with a high average. This is not a reflection on civil service.

Questions for Examinations.—To assist civil service examiners in preparing questions and to assist those taking such examinations in knowing what to study, the author has prepared a number of possible questions, to which are added the questions asked in a recent examination in Philadelphia.

The branches of most importance are: public hygiene, pediatrics, contagious diseases, diseases of the skin, eye, ear, nose, and throat.

The following are illustrations of questions which may be asked:

1. What do you consider the duties of a medical inspector are?
2. What instruments and other equipment should a medical inspector carry with him to properly perform his work?
3. What has been your training since graduation that fits you for the position?
4. What are the duties of a school nurse?
5. Describe in detail a method of performing medical inspection to coöperate with a school nurse.
6. What should be the equipment of a school nurse?
7. What diseases or defects can safely be treated at school by the school doctor?
8. What disease or defects can safely be treated at school by the school nurse?
9. Describe a school consultation with a parent; state object.
10. Describe in detail a routine examination of a pupil for physical defects.

11. Describe in detail the method of examination of a class for contact cases of some contagious disease.

12. Describe the method of examination of the eyes of a pupil.

13. Describe a method of examination of the ears of a child.

14. Describe a method of examination of the nose and throat. What defects or diseases would you look for?

15. Describe a record card which would be suitable for recording the defects found in a pupil.

16. Outline a system for keeping records of work performed by a medical inspector.

17. If you recommend treatment for a physical defect found in a child, and parents ignore the recommendation, how would you proceed to obtain results?

18. How would you conduct an examination of the sanitary condition of a school building?

19. Mention some unsanitary conditions that may be found in a school building.

20. Describe a system of heating and ventilation suited for a school.

21. Outline a method of lighting a school-room containing forty seats.

22. Describe the furniture which should be in a classroom and the location in respect to lighting.

23. Describe an open-air school.

24. What is a special school? What are its purposes? What class of children would you refer to a special school? To a special class?

25. Outline a course of study suited for a mentally backward child.

26. What are the common communicable diseases found among children?

27. What diseases may be suspected in a child with its throat bandaged, and how would you diagnosticate one from another?

28. Give the differential diagnosis in measles, scarlet fever, German measles, and chickenpox.

29. Give the differential diagnosis in chickenpox and variola.

30. What action would you take if you discovered a child suffering from scarlet fever in a class-room?

31. What action would you take if you discovered a child suffering from measles in a class-room? From diphtheria?

32. What should be the period of exclusion from school of a child suffering from measles? Chickenpox? Smallpox? Diphtheria? Scarlet fever? Whooping cough?

33. What diseases should be reported to the Health Department?

34. Describe the technique of performing a vaccination.

35. What constitutes a successful vaccination?

36. When is a child immune against smallpox?

37. Describe the method of taking a culture in a suspicious case of diphtheria.

38. When may a child who has had diphtheria return to school with safety to the class? In scarlet fever? In measles? In whooping cough?

39. Describe a method of disinfecting a school after finding of a case of diphtheria.

40. Describe a method of examination for vision.

41. What inflammatory diseases may affect the conjunctiva and how would you diagnosticate one from the other?

42. Describe a case of trachoma.

43. How would you test the vision of an illiterate? Of a feeble-minded child?

44. Describe a method for testing hearing of a child.

45. What diseases may cause earache?

46. What diseases may cause a swelling of face or neck?

47. Describe a method for testing speech.

48. What defects may occur in breathing and mention their causes?

49. Name the five commonest and most prevalent diseases of the skin occurring in children. Diagnosticate one from the other.

50. Describe three skin diseases which are contagious.

51. Describe the symptoms of two common nervous diseases occurring in children.

52. What are the causes and treatment of lateral curvature of the spine?

53. What systemic diseases would debar a child from taking part in the physical exercises at school?

54. Name the physical defects which may cause a subnormal or mentally defective child.

55. Outline a method of inspection for diagnosticating mental deficiency.

56. Describe the Binet tests.

57. What recommendations would you offer for a subnormal or retarded pupil? For a mentally defective pupil?

COMPETITIVE EXAMINATION FOR SCHOOL MEDICAL INSPECTOR HELD IN PHILADELPHIA.

1. What in your opinion are the two most important acute throat infections, and how would you diagnosticate them?

2. What are the principal etiologic factors in acute middle-ear infections occurring in children, and how make early diagnosis of the ear involvement?

3. What objective symptoms would lead you to believe that a child is in need of nasal treatment?

4. Name the contagious diseases of the eye or its appendages, and give in detail technique of examination.

5. Give age at which chlorosis occurs most frequently; its causes; the symptoms and blood conditions.

6. Mention the causes of backache in young girls aside from that due to pelvic disease.

7. State symptoms which would cause you to suspect the existence of an eruptive fever in its early stage.

8. State causes which would determine you to exclude children from attending school.

9. Describe a routine method of school medical inspection, including inspection, methods of heating, lighting, ventilating, cleaning, exercise, and physical examination.

10. Draw a simple diagram of and described an ideal school-room, with furniture, for twenty children of about fourteen years of age.

11. Describe briefly a fresh-air school, such as would be possible in the centre of a city of the first class, and outline the course of treatment given to a pretubercular child of fourteen years attending it in winter.

12. A teacher reports a girl of fifteen as being deficient in her studies; outline a practical investigation giving five possible reasons for such a condition, with a brief treatment of the cause as finally determined.

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